SR101 Series 2 Audio Console

OPERATION AND SERVICE MANUAL

Manufactured by
SHURE BROTHERS INC.
222 Hartrey Avenue
Evanston, Illinois 60204 U.S.A.

27A1171 (SD) (95E652)

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SR101 Series 2 Audio Console

SPECIFICATIONS

Equipment Type ..... All silicon transistor mixer/preamplifier

Number of Input Channels 8

Power Output ..... +19 dBm (program line level)

Voltage Gain*

Program ..... 73 ±3 dB MIC input to LINE LEVEL out

50 ±3 dB AUX input to LINE LEVEL out

23 ±3 dB MIC input to MIC LEVEL out

Monitor ..... 78 ±3 dB MIC input via PROGRAM MONITOR to LINE LEVEL out

65 ±3 dB MIC input via PROGRAM MONITOR to PHONES out

87 ±3 dB MIC input via one channel MONITOR to LINE LEVEL out

Link ..... 38 ±3 dB MIC input to LINK OUT (with 600-ohm termination)

30 ±2 dB LINK IN to LINE LEVEL out

Accessory ..... 48 ±2 dB MIC input to ACCESSORY output (via pins 1-8/INPUTS)

43 ±3 dB MIC inputs to ACCESSORY output (via pin 9/PROGRAM)

Frequency Response ... ±3 dB, 20 Hz–20 kHz (150-ohm source; 600-ohm load)

Input Sensitivity ..... 0.4 mV max. for +4 dBm program output

Distortion ..... THD less than 1% at +12 dBm, 30 Hz –20 kHz; IM distortion less than 1% at +12 dBm

Noise

(300 Hz-20 kHz) ..... – 128 dBV (equivalent input noise at full gain)

– 78 dBm output noise (MASTER Volume Control down)

– 53 dBm output noise (one channel Volume Control and MASTER Volume Control up)

Hum and Noise

(20 Hz-20 kHz) ..... – 125 dBV (equivalent input hum and noise at full gain)

– 68 dBm output noise (MASTER Volume Control down)

– 50 dBm output noise (one channel Volume Control and MASTER Volume Control up)

Signal to Noise Ratio

(20 Hz-20 kHz) ..... Typically 81 dB at maximum output with one channel Volume Control and MASTER Volume Control at 10 (approximately 60 dB gain)

Input Attenuation ..... 0-30 dB (10 dB steps)

Input Clipping Level at 1 kHz:

MIC Input ..... 315 mV (INPUT ATTEN at 0; Ch. Volume at 2)

17.5 mV (INPUT ATTEN at 0; Ch. Volume at 14)

10V (INPUT ATTEN at –30; Ch. Volume at 2)

0.56V (INPUT ATTEN at –30; Ch. Volume at 14)

AUX Input ..... 3.15V (INPUT ATTEN at 0; Ch. Volume at 2)

0.18V (INPUT ATTEN at 0; Ch. Volume at 14)

100V (INPUT ATTEN at –30; Ch. Volume at 2)

5.6V (INPUT ATTEN at –30; Ch. Volume at 14)

Input Common Mode Rejection ..... 100 dB min. at 100 Hz (balanced inputs)

Low-Frequency Equalization ..... ±13 dB at 100 Hz with respect to 0 (flat) setting

High-Frequency Equalization ..... ±12 dB at 10 kHz with respect to 0 (flat) setting

*Measurement conditions: MIC input through 150 ohms, AUX input through 33 kilohms, LINK IN through 600 ohms; PROGRAM LINE LEVEL and MONITOR LINE LEVEL terminated in 600 ohms, PROGRAM MIC LEVEL terminated in 150 ohms, MONITOR PHONES terminated in 8 ohms; MASTER Volume, Channel Volume and MONITOR Controls full up; all other controls and switches 0 or off.

SR101 Series 2 Audio Console

SPECIFICATIONS

Feedback Filter
Frequencies ..... 130 Hz; 800 Hz; 2 kHz; 5 kHz

Tone Oscillator ..... 1 kHz; less than 1% distortion; variable level

Input Impedance at 1 kHz:
Microphone ..... 1.2 kilohms balanced (for use with 25- to 600-ohm microphones)
Auxiliary (Channels 7 and 8) ..... 170 kilohms unbalanced
Link Input ..... 35 kilohms unbalanced

Output Impedances:
Program ..... Balanced line level: 120 ohms actual (for use with 600-ohm lines)
Microphone level: 0.5 ohms actual (for use with 25- to 600-ohm inputs)
Monitor ..... Unbalanced line level: 600 ohms actual (for use with 600-ohm or high-impedance phones, or 600-ohm lines)
Headphones: 3 ohms actual (for use with 4- to 16-ohm headphones)
ACCESSORY AUX LEVEL (unbalanced) pins 1-8/INPUTS: 33 ohms actual (for use with 3-kilohm or greater loads); pin 9/PROGRAM: 600 ohms actual
Link Output ..... 600 ohms (actual)

Monitor System ..... Headphone and/or 600-ohm line output; individual and mixed channel select or program; pre- and post-link monitoring

Reverberation System ..... Spring type with individual channel intensity controls and high- and low-frequency equalization

Link Jack System ..... External signal conditioning output/input; high-level auxiliary amplifier and tape recorder signal output; multiple Console connection (mix bus); remote master volume control

VU Meter Calibration ... +4 dBm (1.23 Vrms) at 1 kHz to 600-ohm load (METER SENSITIVITY Control in CAL position) [22 dB-range METER SENSITIVITY Control in full clockwise position provides 0 VU reading of −18 dBm (0.1 Vrms) on 600-ohm load]

Phasing (polarity) ..... AUX LEVEL input and LINK IN tips and pin 3 of INPUT connectors in phase with pin 9 of ACCESSORY OUTPUT; tips of LINK OUT, PROGRAM LINE LEVEL, and MONITOR LINE LEVEL outputs; tip of PHONES jack; and pin 3 of PROGRAM LINE and MIC LEVEL outputs. (PHASE Switch in 0° position.) Pins 1-8 of ACCESSORY OUTPUT out of phase with the above.

Phase Switch ..... Output polarity-reversing switch (0°, 180°) (reverses phase of all program outputs)

30 Vdc Bus ..... Pin 10 on ACCESSORY AUX LEVEL connector is regulated +30 ±3.5 Vdc supply; pin 11 is ground (earth). May be used to power accessories with up to 50 mA.

Operating Voltage ..... 90-132 Vac, 50/60 Hz (SR101)
90-132, 180-250 Vac, 50/60 Hz (SR101-2E)

Power Consumption ... 20 watts max. (Console only). 500 watts max. (SWITCHED A. C. receptacle)

Temperature Range:
Operating ..... −7° to 54°C (20° to 130°F)
Storage ..... −29° to 71°C (−20° to 160°F)

Dimensions ..... 311 mm x 483 mm x 162 mm (12¼" H x 19" W x 6⅜" D)

Installation ..... Equipped for standard 19" rack mounting (12¼" height); may be operated in accessory A101A Carrying Case or in custom control center

Weight ..... 22 lb (10 kg)

Finish ..... Matte black, with beige write-on trim strip

Certifications ..... Listed by Underwriters' Laboratories, Inc.; listed by Canadian Standards Association as certified (SR101 only)

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SR101 Series 2 Audio Console

DESCRIPTION

(Shown in A101A Carrying Case with A101B Panel Lamp)

The Shure Model SR101 Series 2 Audio Console is a solid-state, eight-channel microphone mixer-preamplifier that enables the operator to mix as many as eight microphones with individual control over volume, reverberation, and high- and low-frequency equalization. The Series 2 Consoles have rear-panel provisions for connection to up to eight Shure SR110 Professional Monitor Mixers. The SR110 is a self-contained, eight-channel, line level mixer designed to provide a separate stage monitor mix that follows the program mix levels. In addition, it may be used in multi-track recording as a recording mix panel. The Console has two outputs: a program output and a monitor output. In addition, channels 7 and 8 contain switch-selectable input connectors for use with auxiliary high-level sources or high-impedance microphones. Master volume controls regulate program and monitor outputs. Program and monitor switches permit the operator to select the input signals to be routed to each of the two outputs.

The program output has both a 600-ohm, balanced, line level output and a low-impedance, balanced, microphone output. The monitor has two outputs: a 600-ohm unbalanced output and an 8-ohm balanced headphone output. Four switch-selectable feedback filters are included in the program output, and a pair of link jacks facilitate connection to an additional audio console, mixer, or external equipment such as compressors, limiters or equalizers.

The Console contains a VU meter with adjustable sensitivity to indicate program output level. A built-in 1 kHz tone oscillator facilitates synchronization of all meters in the system. An optional panel lamp accessory may be connected to the front panel lamp connector for illumination of controls. Accessory equipment drawing up to 500 watts may be connected to the rear-panel switched ac receptacle. A front-panel trim strip provides space for pencilled notations.

The regulated power supply is designed to operate over a wide range of input voltages, permitting the use of extremely long ac extension cables without performance degradation.

The solid-state components in the SR101 Audio Console are protected against damage as a possible result of open-circuit or short-circuit conditions on the inputs or outputs. All components are conservatively rated and are operated well within their respective ratings to assure long life and trouble-free performance.

The Console is supplied with rack-mounting screws and spare fuses (the SR101-2E comes with a detachable line cord).

The Console is Underwriters' Laboratories, Inc., listed, and is listed by the Canadian Standards Association as certified (SR101 only).

The following accessories are specifically designed for use with the SR101 Series 2 Audio Console:

A101A	Carrying Case
A101B	Panel Lamp Accessory
SR110	Professional Monitor Mixer

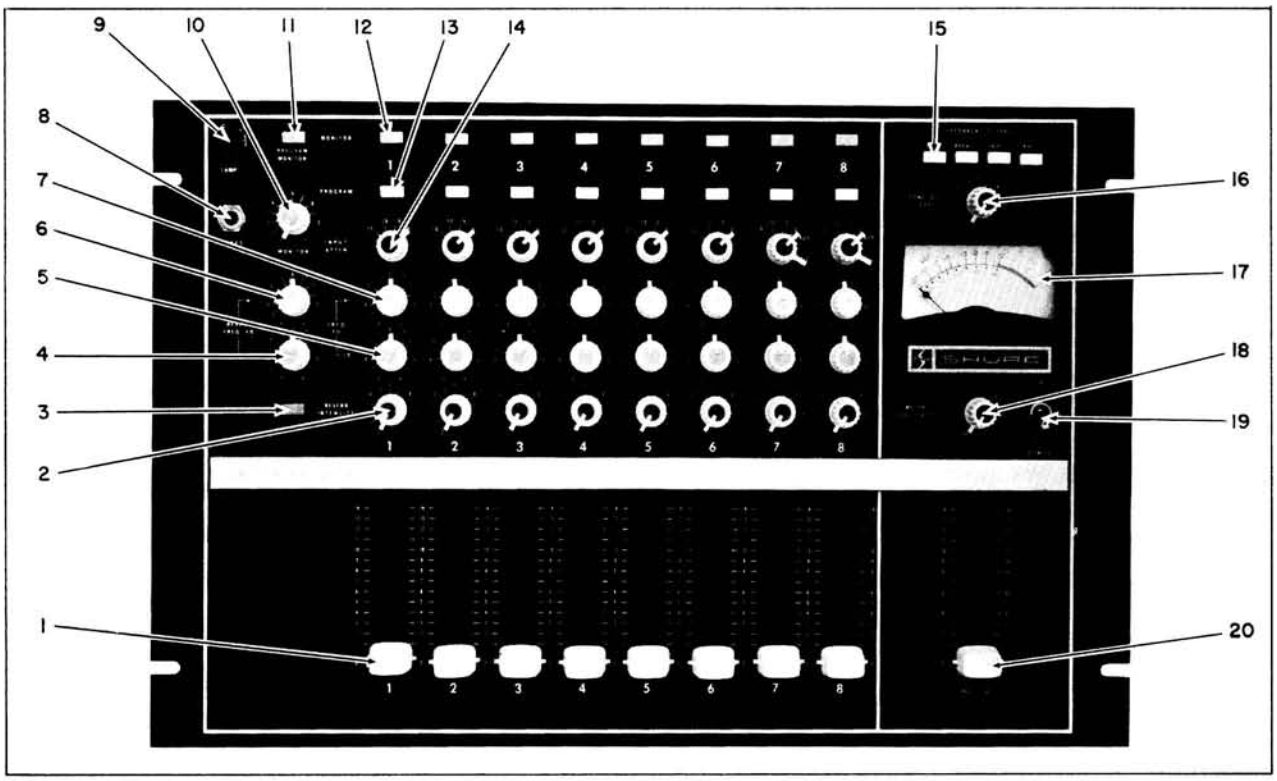


FIGURE 1. SR101 SERIES 2 AUDIO CONSOLE FRONT PANEL

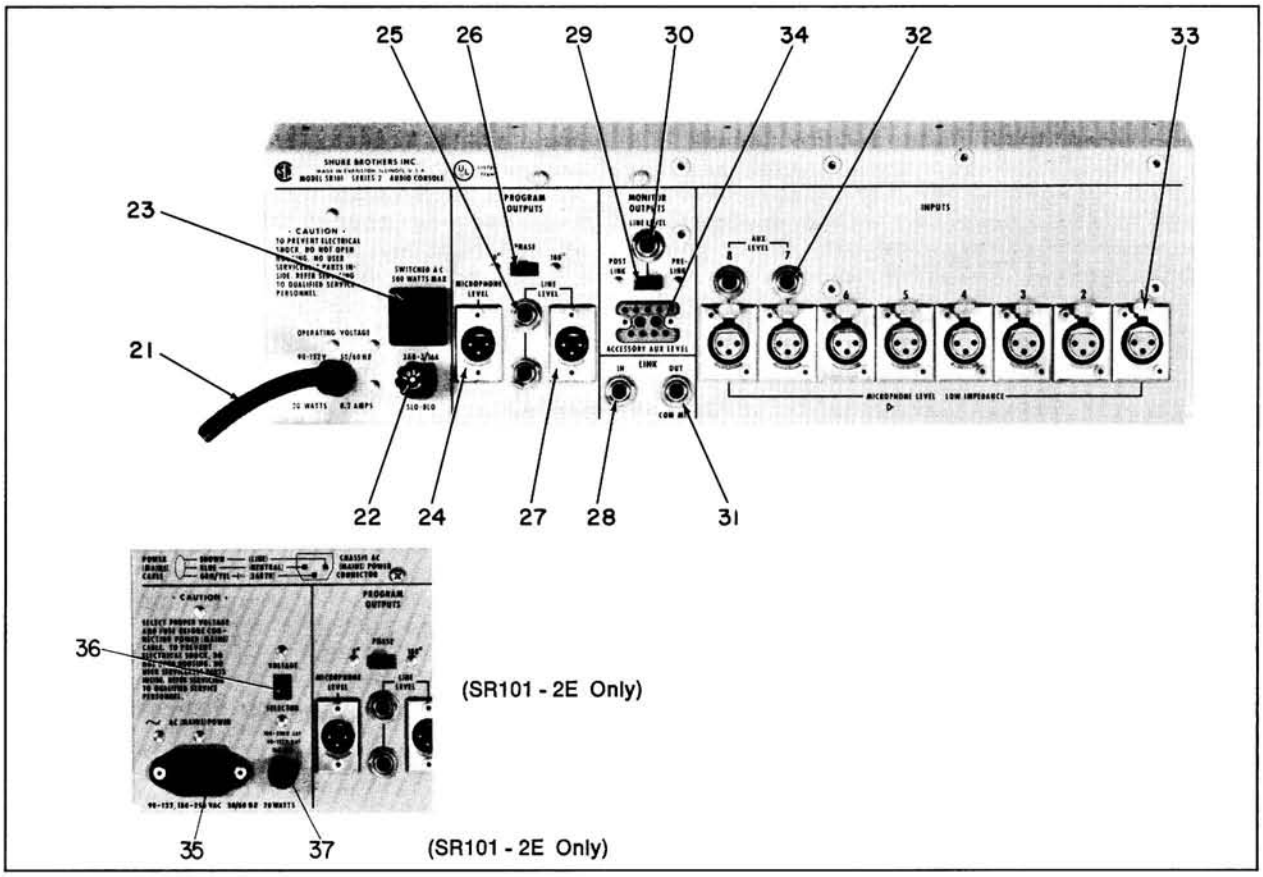


FIGURE 2. SR101 SERIES 2 AUDIO CONSOLE REAR PANEL

SR101 Series 2 Audio Console

OPERATING INSTRUCTIONS

FUNCTIONAL IDENTIFICATION (Refer to Figures 1 and 2, Page 2.)

NOTE: All push-button switches are "on" when in (depressed) and "off" when out (released). Input attenuator switches are calibrated in decibels; all other front panel controls are numbered for reference only.

1. Individual Channel Volume Slide Controls (Eight) — Control volume and input clipping level of each channel separately.
2. REVERB INTENSITY Rotary Controls (Eight) — Control reverb level for each channel.
3. Master REVERB Push-Button Switch — Turns on (or off) amount of reverb preset by channel REVERB INTENSITY controls.
4. REVERB FREQuency EQualizer-LOw Rotary Control — Adjusts low-frequency reverb signal equalization.
5. Individual Channel FREQuency EQualizer-LOw Rotary Controls (Eight) — Adjust low-frequency signal equalization for each channel.
6. REVERB FREQuency EQualizer-HIgh Rotary Control — Adjusts high-frequency reverb signal equalization.
7. Individual Channel FREQuency EQualization-HIgh Rotary Control (Eight) — Adjusts high-frequency signal equalization for each channel.
8. PHONES Output Jack — Provides for connection of stereo or monophonic headphones for monitoring.
9. Panel LAMP Accessory Connector — Provides connection for optional panel lamp accessory to illuminate front panel.
10. MONITOR Level Rotary Control — Controls volume level to PHONES Jack (8) and MONITOR OUTPUT/LINE LEVEL Jack (30).
11. PROGRAM MONITOR Push-Button Switch — Connects total program output (all channels and reverb) to PHONES Jack (8) and MONITOR OUTPUT/LINE LEVEL Jack (30).
12. Individual Channel MONITOR Push-Button Switches (Eight) — Connect individual channel outputs (without reverb) to PHONES Jack (8) and MONITOR OUTPUT/LINE LEVEL Jack (30) when PROGRAM MONITOR Switch (11) is off.
13. Individual Channel PROGRAM Push-Button Switches (Eight) — Connect individual channel inputs to program output.
14. Individual Channel INPUT ATTENuator Rotary Switches (Eight) — Provide choice of input signal attenuation for each channel. Dual switches on channels 7 and 8 also select low-impedance (MIC) or high-impedance (AUX) input connections.
15. FEEDBACK FILTERS Push-Button Switches (Four) — Provide for elimination of acoustic feedback in four most probable audio frequency ranges.
16. TONE OSCillator LEVEL Switch/Rotary Control — Turns on and adjusts level of 1 kHz tone generated internally for set-up purposes.
17. True VU Meter — Indicates volume level of program output. (Meets all current standards for VU Meters).
18. METER SENSITIVITY Rotary Control — Adjusts VU meter sensitivity for wide ranges of program level indication.
19. POWER ON-OFF Toggle Switch — Applies ac power to power supply and SWITCHED A.C. Receptacle (23).
20. MASTER Volume Slide Control — Adjusts level of total program output.
21. Ac Grounded Line Cord — Connects ac power source to Console power supply (SR101 only).
22. 3AG-3/16A SLO-BLO Ac Fuse — Protects Console ac input line against overload (SR101 only).
23. SWITCHED A. C. Grounded Receptacle — Provides up to 500 watts of switched ac power to accessory equipment (SR101 only).
24. PROGRAM OUTPUTS/MICrophone LEVEL 3-Pin Connector — Provides low-impedance microphone-level program output.
25. PROGRAM OUTPUTS/LINE LEVEL Phone Jacks (Two) — Provide balanced or unbalanced output connections to power amplifier.
26. PROGRAM OUTPUTS/PHASE Slide Switch — Reverses phase (polarity) of LINE LEVEL and MIC LEVEL program outputs with respect to inputs.
27. PROGRAM OUTPUTS/LINE LEVEL 3-Pin Connector — Provides balanced output connection to power amplifier.
28. LINK IN Phone Jack — Provides input connection for external equipment (compressor, limiter, equalizer, etc.).
29. MONITOR OUTPUT/POST LINK-PRE LINK Slide Switch — Selects program monitoring either before or after external equipment connection to LINK Jacks (28, 31).
30. MONITOR OUTPUT/LINE LEVEL Phone Jack — Provides monitor output connection to power amplifier.
31. LINK OUT Phone Jack — Provides output connection for external equipment, or mix bus to add Consoles.
32. INPUTS/AUX. LEVEL Phone Jacks (Two) — Provide for connection of high-impedance sources to channel 7 or 8 inputs.
33. INPUTS/MICROPHONE LEVEL 3-Pin Jacks (Eight) — Provide for balanced connection of low-impedance sources to channels 1 through 8 inputs.
34. ACCESSORY AUX LEVEL 11-Pin Connector—Provides output connection to Shure SR110 Monitor Mixer.
35. AC (MAINS) POWER 3-Pin Connector—Connects ac power cable to Console power supply (SR101-2E only).
36. VOLTAGE SELECTOR Slide Switch—Selects operating voltage range of 90 to 132 or 180 to 250 Vac, 50/60 Hz (SR101-2E only).
37. 180-250V 0.1AT/90-132V 0.2AT Ac Fuse—Protects Console ac input line against overload (SR101-2E only).

GENERAL OPERATING INSTRUCTIONS

WARNING

Voltages in this equipment are hazardous to life. Make all input and output connections with ac power disconnected. Refer servicing to qualified service personnel.

1. Using hardware provided, install Console securely in standard 19″ (483 mm) rack or optional A101A Carrying Case prior to making electrical connections. For custom installations, see mounting template supplied with Console. If desired, connect A101B Panel Lamp Accessory to LAMP Connector (9).

2. Set all front-panel switches to off (out) and all controls to 0. Set rear-panel PHASE Switch (26) to 0°.
3. Connect desired PROGRAM OUTPUT/LINE LEVEL Connector (25,27) to power amplifier input connecting cable. (NOTE: Shure SR105 Power Amplifiers are supplied with audio connecting cables.) If Console output is to be fed to another mixer or tape recorder microphone input, use PROGRAM OUTPUT/MIC LEVEL Connector (24). If desired, connect monophonic or stereo headphones to front-panel PHONES Jack (8). Connect speakers to power amplifier.
4. Connect one or more low-impedance microphones to rear-panel INPUTS/MICROPHONE LEVEL Connector (33). Any high-quality dynamic, ribbon or condenser low-impedance microphone may be used. Connect high-impedance microphones or auxiliary high-level sources to INPUTS/AUX. LEVEL Connectors (32) in channels 7 or 8 only. If AUX. LEVEL Connectors are used, set corresponding front-panel MIC/AUX (INPUT ATTEN) Switch (14) to AUX.
5. If external signal-processing equipment such as an equalizer, compressor or limiter is to be used, connect Console LINK OUT Connector (31) to external equipment input and Console LINK IN Connector (28) to external equipment output. (See *Link Jacks,* Page 8, for detailed information.)
6. SR101: Connect ac line cord (21) to grounded 90- to 132-volt, 50/60 Hz ac source.
   Line cord is a 2.44m (8-ft.), 3-conductor cord with 3-pin grounding plug. If extension cords are required, use high-quality, rubber-jacketed cable with 18 gauge or larger wire.
   SR101-2E: Obtain suitable 3-pin male ac connector and attach to line cord: brown lead to "hot" or "live" terminal, blue lead to neutral terminal, and green/yellow lead to ground or earth terminal. (Connector should be installed by qualified service personnel.) Select proper operating voltage (90-132V or 180-250V) using VOLTAGE SELECTOR Switch (36). Note that switch positions are marked 115 and 220 volts. Make certain proper fuse is installed in fuseholder (37): 0.1AT with switch set to 220, or 0.2AT with switch set to 115. Insert female end of line cord into chassis power connector (35) and connect male plug to 3-wire grounded ac power receptacle providing proper operating voltage.
7. Turn on front-panel POWER Switch (19) and allow one to two minutes warmup time. This warmup time allows the supply voltages to stabilize and capacitors to charge to provide optimum performance. Depress PROGRAM Switch (13) for channel to be used. (IMPORTANT: No program output will result if this switch is not depressed!) Set INPUT ATTEN Control (14) for that channel initially to 0 for normal or PA use, to —10 for instrumental music, or to —20 or —30 for "hard" rock music. For AUX. INPUT sources (channels 7 and 8), set INPUT ATTEN Control initially to —20 or —30.
8. Set MASTER Volume Control (20) to 7. Set METER SENSITIVITY Control (18) to CAL position. Have someone sing or talk into microphone and raise channel Volume Control (1) to achieve desired sound level. If VU Meter (17) reads too low at proper sound level, increase METER SENSITIVITY Control until normal meter movement — operation in black area of scale with occasional peak excursions into red area — is obtained. If meter still reads low, reduce power amplifier volume level and increase channel volume level. For single microphone set-up, if meter indicates excessively high level ("pinning" or "pegging" needle), decrease channel Volume Control to obtain good meter reading and increase power amplifier volume level or input sensitivity to obtain proper sound level. In multiple microphone set-up, it may be necessary to decrease MASTER Volume Control in order to maintain channel Volume Control setting. Ideally, channel Volume Control should remain approximately at mid-range (7-9) to facilitate increases or decreases in control setting due to program change; INPUT ATTEN Control (14) adjustment will aid in maintaining this setting. If feedback occurs below desired sound level, consult section on *Feedback Filters* (Page 8).
9. Set HI and LO FREQ EQ Controls (7,5) for channel in use. Vertical position (0) indicates "flat" frequency response. Clockwise (+) settings increase high-frequency (treble) or low-frequency (bass) equalization and counterclockwise (—) settings decrease frequency equalization. Note that these controls also affect feedback; readjustment of Feedback Filters (15) may be necessary.
10. If reverberation is desired, depress REVERB Switch (3) and adjust REVERB INTENSITY Control (2) to desired level for channel in use. Recommended settings are: speech — 0, vocals — 3-6, instruments — 5-10. Adjust HI and LO REVERB FREQ EQ Controls (6,4) for desired frequency equalization.
11. To monitor channel in use, depress MONITOR Switch (12) for that channel. Monitor output is available at front-panel PHONES Jack (8) and rear-panel MONITOR OUTPUT/LINE LEVEL Jack (30). Adjust MONITOR Control (10) for comfortable listening level. Note that any or all channels may be monitored whether or not PROGRAM Switch (13) for that channel is depressed; merely depress MONITOR Switch for desired channel. When total program output monitoring is desired, depress PROGRAM MONITOR Switch (11). Note too that only those channels with PROGRAM Switch (13) depressed will be heard while monitoring with PROGRAM MONITOR Switch depressed.
12. NOTE: During temporary shutdown (break, intermission), it is not necessary to turn off Console power. It is designed to operate continuously, and optimum performance is maintained after internal voltages are allowed to stabilize. Also, do not turn off all microphones. Leave the master or announcer's microphone on (PROGRAM Switch depressed) so that if the Console is left unattended, announcements may be made, and the Console operator will be alerted that the next performance is about to begin.

MOUNTING AND VENTILATION

The Shure SR101 Audio Console may be operated in a standard 19" (483 mm) audio equipment rack, in a Shure A101A Carrying Case, or custom-mounted in a table- or desk-type control center. Four rack-mounting screws are provided with the Console. These screws may also be used if the Console is to be custom-mounted in a metal-top control center.

A custom-mounting template is supplied with the Console. Cutting dimensions and drill hole locations are given, as are clearances for insertion and ventilation. The dimen-

sions given should be followed to provide adequate cable clearance (see Figure 3, Page 5).

In either rack- or custom-mounted installations, consider rear-panel access before installation is made. Although most installations will not require frequent access, it should be remembered that input and output changes, and some switch movements, will necessitate rear-panel access. Rear panels are most easily reached in standard audio racks or in custom installations having bottom access, such as an open desk or a lower control center access panel.

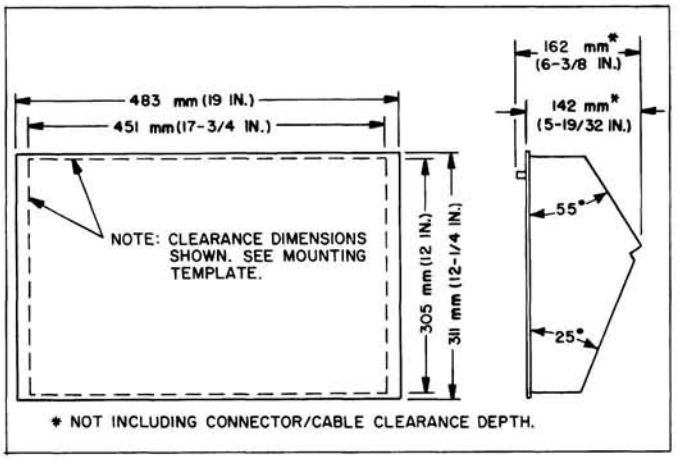


FIGURE 3. SR101 AUDIO CONSOLE DIMENSIONAL OUTLINE DRAWING

POWER SUPPLY

SR101: The SR101 regulated power supply is designed to operate from 90 to 132 volts ac, 50/60 Hz without adjustments, allowing the Console to meet all specifications over this wide range of ac input voltages. A three-conductor, grounded line cord (21) supplies ac power to the Console through the front-panel POWER ON-OFF Switch (19). The Console consumes 20 watts maximum (0.2 amperes) and the ac line input is protected by a 3/16-ampere slo-blo fuse (22) and a wired-in 3/10-ampere slo-blo fuse in series. A wired-in 1-ampere slo-blo fuse protects the 5.6-volt secondary winding (indicator lamp) of the power transformer.

CAUTION

These fuses should not be replaced with any other size or type of fuse.

Accessory equipment may be connected to the rear-panel SWITCHED A.C. Receptacle (23). The accessory equipment may consume up to 500 watts maximum, which provides for use with high-power amplifiers such as the Shure SR105. Note that the receptacle is switched but not fused; all accessory equipment used with the Console should contain its own fuse.

SR101-2E: The SR101-2E regulated power supply is designed to operate from either 90 to 132 volts ac or 180 to 250 volts ac, 50/60 Hz, as selected by the rear-panel VOLTAGE SELECTOR Switch (36). A three-conductor, grounded line cord supplies ac power to the Console through the front-panel POWER ON-OFF Switch (19). The SR101-2E line cord does not have a connector on the power source end of the cord. Obtain a suitable three-pin male ac connector and install it on the line cord: brown to "hot" or "live" terminal, blue lead to neutral terminal, and green/yellow lead to ground or earth terminal. (Connector should be installed by qualified service personnel.) The ac line is protected by a 0.1-ampere Slo-Blo fuse (for 180- to 250-volt operation) or a 0.2-ampere Slo-Blo fuse (for 90- to 132-volt operation). Wired-in 3/10- and 1-ampere fuses protect the ac line and power transformer 5.6-volt secondary winding, respectively.

FUNCTIONAL CIRCUIT DESCRIPTION

(See Figure 4, Page 6)

Each 3-pin professional audio input Microphone Connector (33) feeds its own low-impedance Input Transformer, which provides a gain increase of 23 dB. Channels 7 and 8 also contain switchable AUX LEVEL phone jacks (32) which accept high-impedance microphones or other inputs. The Input Transformers (and, on channels 7 and 8, the AUX-MIC Switch) are fed to 0-30 dB INPUT ATTEN Controls (14) and then to the Preamplifier, which provides a +6 to +30 dB gain increase. The amount of gain provided by the Preamplifier (6 to 30 dB) is controlled by the Channel Volume Control (1), providing an increase in input clipping level as gain is reduced. The Preamplifier circuits contain the individual Channel Volume Controls and feed the individual Channel Equalizer (HI and LO FREQ EQ) Controls (7,5) which decrease the signal approximately 2 dB when set to the 0, or "flat," setting.

The Equalizer outputs go to the Program and Monitor circuits, and to the ACCESSORY AUX LEVEL Connector (34) for interconnection with SR110 Monitor Mixers. The Channel Equalizer outputs going to the Program circuits go first to the individual channel PROGRAM Switch (13), and subsequently to the Reverb circuits and individual channel REVERB INTENSITY Controls (2). When reverb is not used, the REVERB INTENSITY Control is set to 0, and the channel output is sent directly to the Program Mix Amplifier. When reverb is employed — REVERB Switch (3) depressed — the REVERB INTENSITY Control feeds the Reverb Intensity Mix Amplifier, Reverb Equalizer, Reverb Driver and Differential Amplifiers, Reverb Output Mix Amplifier, and then into the Program Mix Amplifier. Note that as the control is increased the amount of non-reverb ("dry") signal sent to the Program Mix Amplifier is reduced, while the signal sent to the Reverb Intensity Mix Amplifier is increased.

The Channel Equalizer output to the Monitor input, controlled for each channel by a MONITOR Switch (12), is fed to the Monitor Mix Amplifier, which changes the input by +3 to −13 dB. The Amplifier output goes to the PROGRAM MONITOR Switch (11), where it may be selected to continue through the MONITOR Level Control (10), +40 dB Monitor Amplifier, and to the rear-panel MONITOR OUTPUT/LINE LEVEL jack (30) and front-panel PHONES jack (8).

The Program Mix Amplifier goes to both the PRE LINK side of the POST LINK/PRE LINK Switch (29) for routing to the Monitor circuits, and through a 560-ohm resistor to the LINK jacks (28,31). When accessory equipment is not connected to the LINK jacks, the jacks are bypassed and the program signal is fed to the POST LINK side of the POST LINK/PRE LINK Switch for monitoring, and to the MASTER Volume Control (20). Note that the PRE LINK/POST LINK Switch output to the Monitor circuits is also routed to the ACCESSORY AUX LEVEL Connector (34).

The output of the MASTER Volume Control, after feeding a 0 dB gain Amplifier, is sent through a bank of four selectable FEEDBACK FILTERS (15), which provide attenuation at 130, 800, 2000 and 5000 Hz for feedback control. The FEEDBACK FILTERS output goes to a +6 to +31 dB Amplifier, also controlled by the MASTER Volume Control, through a 180° PHASE Switch (26), and into the Program

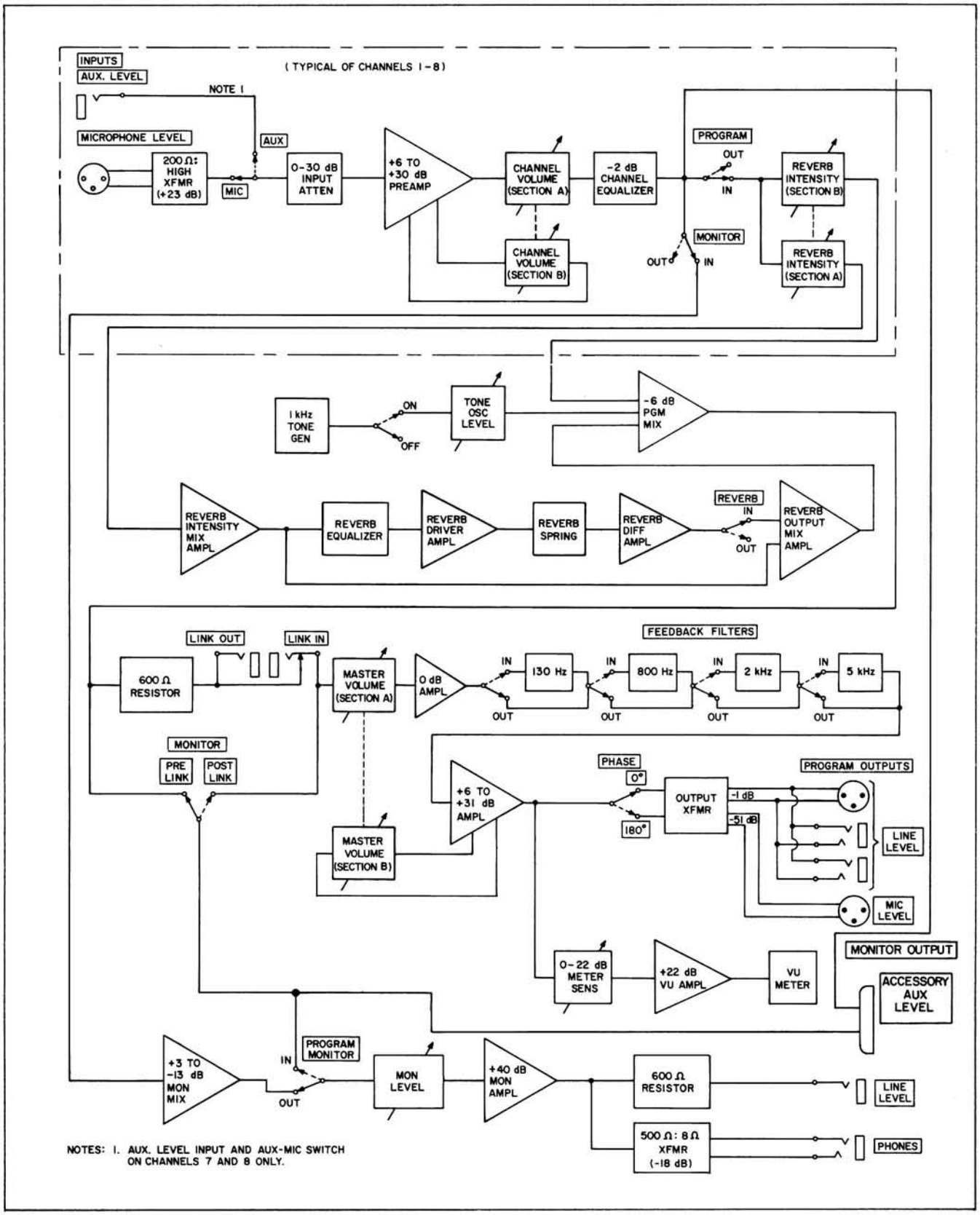


FIGURE 4. SR101 SERIES 2 CONSOLE BLOCK DIAGRAM

Output Transformer. The Transformer feeds three LINE LEVEL Output Connectors (25,27) and a MIC LEVEL Output Connector (24), which is at 50 dB below line level. The +6 to +31 dB Amplifier also feeds the METER SENSITIVITY Control (18), which goes to a +22 dB Meter Amplifier, and then to the VU Meter (17).

The Console also contains a 1 kHz Tone Generator for use in set-up and checkout. The Generator is activated and controlled by the TONE OSC LEVEL Switch/Control (16), and the control output is fed to the Program Mix Amplifier.

A detailed description of the Console circuits and controls and their uses is provided in the following paragraphs of this section.

INPUT CHANNELS

Eight professional, three-pin, audio MICROPHONE LEVEL Input Connectors (33) are provided on the upper rear panel of the Console. The Console is designed to operate with high-quality, low-impedance dynamic, ribbon or condenser microphones. Two additional AUX. LEVEL Input Connectors (32) are provided for channels 7 and 8. These standard quarter-inch phone jacks allow connection to auxiliary high-level sources or high-impedance microphones. Switches on the channels 7 and 8 INPUT ATTEN Control (14) allow the user to select between either the low-impedance microphone input (MIC), or the high-impedance auxiliary input (AUX). Each low-impedance microphone input is connected to a low-impedance, balanced-input transformer, the output of which is connected to a 0-30 dB input attenuator. On channels 7 and 8, the outputs of the low-impedance microphone transformer and the AUX. LEVEL Input Jack (32) terminate in the AUX-MIC Switch. The output of this switch goes to the 0-30 dB INPUT ATTEN Switch (14). Note that the AUX-MIC Switch has two detented positions; no output will be obtained when the switch is between detent positions. The MIC-AUX Switch grounds the unselected input to reduce crosstalk. This should be considered when connecting inputs to this channel. A 1-kilohm isolation resistor is provided in the AUX input circuit. When the AUX input is not selected, this resistor is grounded, placing the 1-kilohm load on the AUX input. If the source connected to this input is also bridged to feed other inputs, an additional isolation resistor may be required.

The INPUT ATTEN (14) four-position switch provides input attenuations of 0, 10, 20, or 30 dB. This switch allows the user to compensate for the differences in levels due to different sources, such as close talking or distant microphone placement, and to compensate for high output levels from condenser microphones.

The Channel Volume Control (1) is a dual control: one section, in a feedback circuit, sets the gain of the preamplifier, and the second section is a preamplifier output attenuator. This circuit configuration increases the preamplifier input clipping level as the Volume Control is reduced to lower settings. Ideally, the control should operate in the middle range, between 7 and 9. This can generally be accomplished by proper INPUT ATTEN Control (14) setting.

The output of the Channel Volume Control (1) feeds the equalizer circuit. Individual HI and LO FREQ EQ controls (7,5) allow the user to shape the sound of each input channel without affecting the other channels on the Console. The HI FREQ controls provide up to 13 dB of boost or cut at 10 kHz with a 1 kHz hinge point. The LO FREQ controls provide up to 13 dB of boost or cut at 100 Hz with a 1 kHz hinge point. Control settings with plus (+) markings indicate boost, and minus (–) markings denote cut. A 0 setting provides a normal or "flat" frequency response.

The output of the equalizer feeds the channel PROGRAM and MONITOR Switches (13,12). The PROGRAM Switch selects the channels to be connected to the program output. The MONITOR switches select the channels to be connected to the monitor output. The two switches are independent and have no effect on each other.

SOURCE CUING

Microphones, tape recorders, or other sources may be preset, or cued, during a performance in the following manner. With headphones connected to the front-panel PHONES Jack (8) or rear-panel MONITOR LINE LEVEL Jack (30) (high-impedance headphones only), depress the PROGRAM MONITOR Switch (11) and a PROGRAM Switch (13) for a channel that has program material at the proper level on it. Adjust the MONITOR Level Control (10) until an adequate audio level is heard in the headphones. Release the PROGRAM MONITOR Switch and PROGRAM Switch for that channel, and depress the MONITOR Switch (12) for the channel being cued. With the MONITOR Level Control previously set, raise the channel Volume Control (1) until the same audio level heard in the other PROGRAM channel has been reached.

With the channel PROGRAM Switch (13) released and the channel MONITOR Switch (12) depressed, the source will be heard on the headphones and not on the program channel. This allows the Console operator to cue up tapes, check out microphones, etc., without interfering with the program. When the channel is to be activated, depress the channel PROGRAM Switch.

It is most important to have a good knowledge of microphone placement and the performer's microphone technique when cuing a microphone. Always begin cuing in the new microphone at the lowest estimated volume setting. If volume level correction is necessary, slowly raise the Volume Control (1) level. If a change in the INPUT ATTEN (14) setting is required, wait until the vocalist takes a breath or the instrumentalist takes a rest to balance out the volume and attenuation levels to the required degree. Note that minor changes in volume during a performance perceptible to the Console operator are rarely noticed by the audience. However, if the channel level is set too high when the channel is turned on, the sound may "blast" the audience, or cause acoustic feedback, or both. Either condition will prove embarrassing to the Console operator.

REVERBERATION

The SR101 Audio Console contains a built-in electromechanical spring-type reverberation device utilizing four coil springs in two transmission paths. Reverberation is accomplished by driving the input ends of the springs in a torsional mode and transferring the torsional movement back into an electrical signal which exhibits time delay with a long decay time at the opposite ends of the springs. Since the reverberation device is electromechanical in nature, it is sensitive to mechanical shock.

The Console is designed to provide a foundation of "dry," or non-reverb, signal on the total output, no matter how the channel REVERB INTENSITY Controls (2) are set. Of great importance, too, is the fact that reverb intensity can be increased without increasing overall gain. In most units which employ artificial reverberation, the total gain in-

creases as the intensity of the reverberant signal is increased. This generally leads to acoustic feedback. However, the SR101 Audio Console reverb mixing system reduces the "dry" signal as the reverb signal is increased; this provides an almost constant gain and reduces the possibility of feedback as reverb is added.

The following controls are pertinent to reverb operation. The output of the PROGRAM Switch (13) feeds the channel REVERB INTENSITY Controls (2). These are dual controls: one section controls the amount of "dry" signal fed to the program mix amplifier, and the other controls the amount of signal fed to the reverb mix amplifier. As each REVERB INTENSITY Control is increased, the amount of signal to the program mix amplifier is reduced and the amount of signal to the reverb mix amplifier is increased. As stated above, this action keeps the same approximate overall volume level to avoid feedback problems. The REVERB INTENSITY Control is generally used at settings of 0 for speech, 3-6 for vocals, and 5-10 for instruments.

The reverb mix amplifier combines the output of all channel REVERB INTENSITY Controls (2), mixing the signal and sending it to the REVERB FREQ EQ Controls (6,4). The output of the reverb equalizer circuit drives the reverbation system. The separate REVERB FREQ EQ-HI and -LO Controls affect the reverb signal only. These reverb controls modify the reverberant signals in essentially the same way the channel equalization controls modify both "dry" and reverb signals. The REVERB FREQ EQ Controls allow the user to change the reverberant sound to compensate for the reverberation in each room in which the Console is used. In a "boomy" (low-frequency resonant) room, decrease the REVERB FREQ EQ-LO Control or increase the REVERB FREQ-HI Control, or do both until the proper equalized reverb sound is achieved.

The output of the reverberation spring is fed to a differential amplifier whose output is connected to the REVERB Switch (3). This switch turns the reverb system on (in) and off (out) without affecting the overall level or the REVERB INTENSITY Controls (2). In this manner, the REVERB INTENSITY Controls may be preset, and when the REVERB Switch is depressed, the reverb level is predetermined. The reverb signal, after passing through the REVERB Switch, is routed to the program mix amplifier and combined with the "dry" signals from the program channels.

MONITOR SYSTEM

The output of the individual channel MONITOR Switches (12) are combined in the monitor mix amplifier. The channels that appear on the monitor system are independent of the setting of the PROGRAM Switches (13). This feature allows the signals that do not appear on the program output to be fed to the monitor output. This may be useful for providing a talkback or for a "click track" signal feed.

The monitor mix amplifier is a passive mix amplifier; its gain depends on the number of channels selected to be monitored. This type of mixing means that as channels are added to the monitor system, the overall apparent level remains constant while each individual channel contribution is reduced. The output of the monitor mix amplifier feeds the PROGRAM MONITOR Switch (11). When this switch is released, the monitor system carries the channels selected by the individual channel MONITOR Switches (12). When the PROGRAM MONITOR Switch is depressed, the monitor system monitors the output of the program mix amplifier.

It should be noted that the individual channel MONITOR Switches (12) monitor the channels *ahead* of the reverb, and the PROGRAM MONITOR Switch (11) monitors the entire program *after* reverb. The output signal from the PROGRAM MONITOR Switch is fed to the MONITOR Level Control (10), which provides an output signal to drive the monitor output amplifier. The signal from this amplifier appears on the MONITOR OUTPUT/LINE LEVEL Jack (30) on the rear panel, and also through a headphone matching transformer to the PHONES Jack (8) on the front panel. These two outputs may be used simultaneously.

Note that the front-panel PHONES Jack (8) permits the use of either monophonic or stereo headphones (4-16 ohms impedance) without rewiring. High-impedance monophonic headphones may be connected to the rear-panel MONITOR OUTPUT/LINE LEVEL Jack (30).

The purpose of the monitor system is to allow an operator to use headphones to monitor the program if the PROGRAM MONITOR Switch (11) is depressed, or to monitor the individual channels. Monitoring the individual channels allows the operator to determine which microphones are in use, which are turned off, or which may be malfunctioning. Note that it is also possible to use the monitor output to listen to a microphone or cue a tape that is driving a channel 7 or 8 AUX. LEVEL Input Jack (32) without having the signal on the program output.

The second major use of the monitor system is to provide on-stage monitoring, or foldback, which allows the performers to hear themselves, but only gives them a partial mix. This is useful in a system where all the instruments have microphones but the vocalists only want to hear themselves and one or two instruments, such as the piano, to be able to keep in tune. When used in this manner, the MONITOR OUTPUT/LINE LEVEL Jack (30) is connected to the input of an auxiliary power amplifier that is connected in turn to monitor speakers located on stage.

MONITOR MIXER SYSTEM

The rear-panel ACCESSORY OUTPUT/AUX LEVEL Connector (34) of the SR101 provides for interconnection to up to eight Shure SR110 Professional Monitor Mixers. The output of each individual channel *after* the volume, equalization and attenuation channel controls appears on this connector as do the LINK INPUT/OUTPUT total mix signal and the power supply connections. The SR110 is a self-contained, eight-channel, line level mixer designed for use with the SR101 Series 2 or similar equipment. The SR110 can provide a separate stage monitor "mix" that follows the program "mix" levels coming from the eight channels of the SR101. In addition, it may be used in making multitrack recordings: use two SR110s for stereo and four for quadriphonic.

The SR110 provides eight high-impedance, unbalanced, line level inputs to its mixing circuitry, one high-impedance, unbalanced, line level input to its Output Selector Switch for monitoring the program mix, and one line level, 600-ohm, balanced output. Individual channel and master volume controls are provided, as is a switch to choose between monitoring the channels in use (Mixed Inputs) and the total program mix (Program Input). The Mixed Inputs position takes the signal from each channel frequency equalization circuit, and the Program Input position obtains the mixed signal at the PRE LINK/POST LINK Switch (29).

The SR110 has parallel accessory input/output male and female connectors. These connectors permit the connection of additional tandem or "stacked" SR110s. A typical application is shown in Figure 5, Page 9.

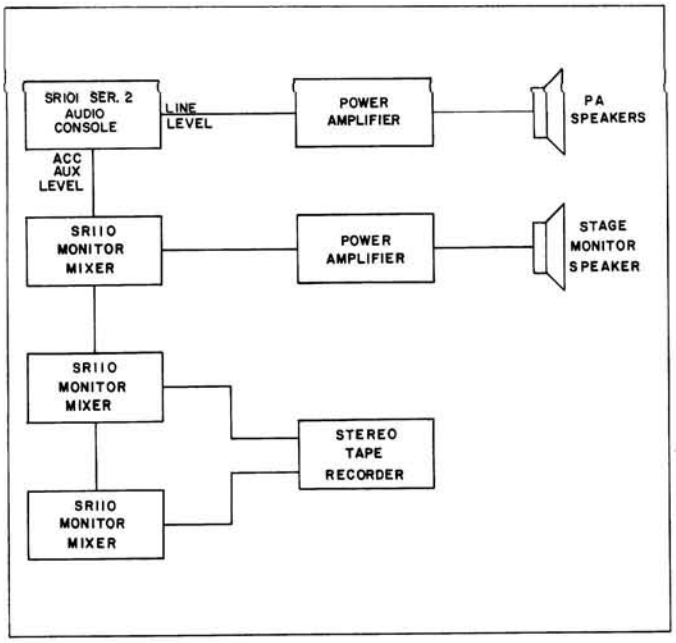


FIGURE 5. SR110 MONITOR MIXER APPLICATIONS

PROGRAM MIX AMPLIFIER

The program mix amplifier is an active mixing amplifier in which gain remains constant independent of the number of individual channel PROGRAM Switches (13) that are activated. The output of the program mix amplifier is connected through a 560-ohm mixing resistor to the LINK Jacks (28,31).

LINK JACKS

The LINK Jacks (28,31) on the rear panel of the Console enable the user to interconnect more Consoles for additional inputs or add external equipment, such as equalizers, compressors, or limiters. When connecting two or more SR101 Audio Consoles together to provide many channel inputs, connect the LINK OUT Jacks (31) of all the units together. It should be noted that the LINK OUT Jack is actually a two-way jack; the impedance at this point is actually 600 ohms and any number of units may be tied together at this point. The LINK IN Jack (28) is an input-only jack and has switching contacts that disconnect the output of the program mix amplifier from the MASTER Volume Control (20).

If an equalizer, limiter or compressor is connected to the Console, the LINK OUT Jack (31) is connected to the input of the external unit and the output of the external unit is connected to the LINK IN Jack (28).

The signals at the LINK JACKS are typically at a level 10 dB below line level. These jacks will accommodate signal levels in the range between −30 to +10 dBm. The LINK IN input impedance is greater than 20 kilohms and may be considered a bridging impedance. The output of the LINK Jacks feeds the MASTER Volume Control (20) which is a two-section control similar to those used in the individual channels. The POST LINK/PRE LINK Switch (29) on the rear panel, in the monitor circuit, allows the operator to monitor the program before (PRE) or after (POST) the LINK Jacks.

FEEDBACK FILTERS

The output signal from the MASTER Volume Control (20) attenuator section is sent to the feedback filter circuit at this point. The FEEDBACK FILTERS (15) are four notch filters whose center frequencies are 130 Hz, 800 Hz, 2 kHz, and 5 kHz. These filters are designed to minimize the acoustic feedback (speaker howl or squeal) that may occur through some combination of room acoustics, microphone and speaker placement, volume increase, or equalization control boost. Each filter modifies the frequency response of the program output, with the lowest (130 Hz) filter affecting the lowest feedback pitch (howl) and the highest (5 kHz) filter affecting the highest feedback pitch (squeal). The two center frequency filters affect feedback modes in the middle ranges of the audio frequency spectrum.

The three upper frequency filters have little effect on voice tonal qualities. The 130 Hz filter, generally used to eliminate low-frequency room reverberations, causes some decrease in bass tones. This may be compensated for by increasing the FREQ EQ-LO Controls (5) slightly for the individual channels in use.

If feedback is present, locate the one FEEDBACK FILTER Switch (15) which eliminates it. Then increase the VOLUME (1) or FREQ EQ Controls (5,7) as desired until another feedback pitch occurs. Then locate the filter to eliminate the new feedback mode. IMPORTANT: Up to two FEEDBACK FILTERS may be used at one time; more than two filters will reduce overall gain and significantly affect system tonal quality.

Note that the PHASE Switch (26), which allows the Console operator to change the output phase, functions to reduce or eliminate acoustic feedback, too. It is normally used to obtain maximum gain before feedback, or to obtain the highest pitched feedback for elimination by the feedback filters.

PROGRAM OUTPUT

The output signal from the feedback filters drives the program output amplifier. The gain of this amplifier is controlled by one-half of the MASTER Volume Control (20) (the other half is a preamplifier output attenuator). The output of the program amplifier is sent to the PHASE Switch (26) mounted on the rear panel of the Console. This switch allows the user to change the phase of the program output, which may be helpful in eliminating or reducing low-frequency acoustic feedback. Generally, this switch is adjusted to the position which either gives the most gain before feedback or, if both positions give the same gain before feedback, use the position that produces the highest pitch feedback. The program signal, after leaving the PHASE Switch, is routed to the output transformer which provides both LINE LEVEL and MIC LEVEL outputs. The LINE LEVEL output is connected to one professional three-pin, male, audio output connector (27) and two three-circuit phone jacks (25). The MIC LEVEL output is a low-impedance output, 50 dB below the LINE LEVEL output, and is connected to a professional three-pin male, audio output connector (24).

Note that all of the program outputs are balanced with respect to ground. If a phone plug is used to connect the mixer line level output to an amplifier or tape recorder and the phone plug is a two-circuit type, the line outputs will automatically become unbalanced. If the 3-pin unbalanced output is used and a phone jack output is *also* to be used, obtain a stereo phone plug and connect the tip and ring of the plug only. (The sleeve is a shield and would cause a ground loop.)

If it becomes necessary to use the MIC LEVEL Output Connector (24) to feed a high-impedance input, use a matching transformer such as one of the Shure A95 Series at the high-impedance input.

The output of the program output amplifier is also fed to the VU Meter (17) circuit.

VU METER CIRCUIT

To allow a wide range of signals to be handled by the VU Meter (17), a 22 dB VU Meter amplifier is provided. The output of the program amplifier is fed to the METER SENSITIVITY Control (18) which in turn feeds the VU Meter amplifier and the Meter. The METER SENSITIVITY Control is calibrated in its maximum counterclockwise position only. The calibration of this position is internally adjusted at the factory for +4 dBm at 0 VU across a 600-ohm load on the program output. The VU Meter amplifier provides the proper signal, impedance, and level for proper VU Meter ballistics and calibration. This amplifier also isolates the Meter from the program output and eliminates the distortion normally caused by the nonlinearities of VU Meters.

TONE OSCILLATOR

The Console contains a built-in 1 kHz tone oscillator for set-up and checkout purposes. The TONE OSC LEVEL Control and ON-OFF Switch (16) injects the 1 kHz tone into the program mix amplifier. The tone is processed through the program channel in the same manner as microphone or auxiliary input signals, except that the reverb system is bypassed.

When using the tone oscillator, calibrate the Console VU Meter (17) and proceed as follows: With the METER SENSITIVITY Control (18) set to CAL, increase the MASTER Volume Control (20) and TONE OSC LEVEL Control (16) until a 0 VU reading is obtained on the VU Meter. A tone reference level has now been established. The Console LINE LEVEL Output (25,27) is now +4 dBm (1.23 volts) and the MIC LEVEL Output (24) is approximately 4 millivolts. These reference signals may be used to set up power amplifiers, tape recorders, or other equipment connected to these outputs (Figure 6A, Page 10). By adjusting the input level (or volume) controls on the associated equipment, all the meters in the audio system can be made to "track." This allows the Console operator to observe the Console VU Meter (17) to see if all the equipment is in its proper operating range. This reference tone may also be used to check out cables and equipment for proper operation.

To check a microphone cable, connect the cable between the Console MIC INPUT Jack (33) (any channel) and the MIC LEVEL Output Jack (24) (refer to Figure 6B, Page 10). Connect headphones to the PHONES Jack (8). Release the PROGRAM MONITOR Switch (11), and for the channel being used, depress the MONITOR Switch (12), release the PROGRAM Switch (13), and set the FREQ EQ Controls (5,7) to 0, the channel Volume Control (1) to mid-range, and INPUT ATTEN Switch (14) to 0. An audible tone should be heard through the headphones as the MONITOR Level Control (10) is increased.

The same process may be used to check out a Console channel. With a good microphone cable, make the connections described above. The tone should be heard clearly through the headphones. If a channel is suspected of poor quality, it can be compared with another channel by connecting the microphone cable to the second channel with all controls set in the same manner as the first. By carefully noting the level and quality of tone on each channel, any significant differences can be established.

To check out an auxiliary channel, perform the process described above, except connect a phone plug to phone plug cable between the LINE LEVEL Output Jack (25) and the AUX. LEVEL Input Jack (32) for the channel (7 or 8) being checked (Figure 6C, Page 10). Set the MIC/AUX Switch (14) to AUX and INPUT ATTEN Switch to −30.

The tone oscillator may also be used to provide a check of cables and equipment connected to the link output. With the LINK OUT Jack (31) connected to the input of an external equipment, such as a Shure SE30 Gated Compressor/Mixer which in turn feeds a broadcast line, disconnect the program output, either at the back of the Console, power amplifier or speakers (Figure 6D, Page 10). Turn the METER SENSITIVITY Control (18) to CAL, set the MASTER Volume Control (20) to 7, and increase the TONE OSC LEVEL Control (16) for a 0 VU Meter (17) reading. Slide the MASTER Volume Control down to 0. Under this set-up condition, the external equipment may now be calibrated or checked out without affecting the program output. After calibrating the external equipment, turn off the tone oscillator, and return the MASTER to 7. Reconnect the power amplifier or speakers.

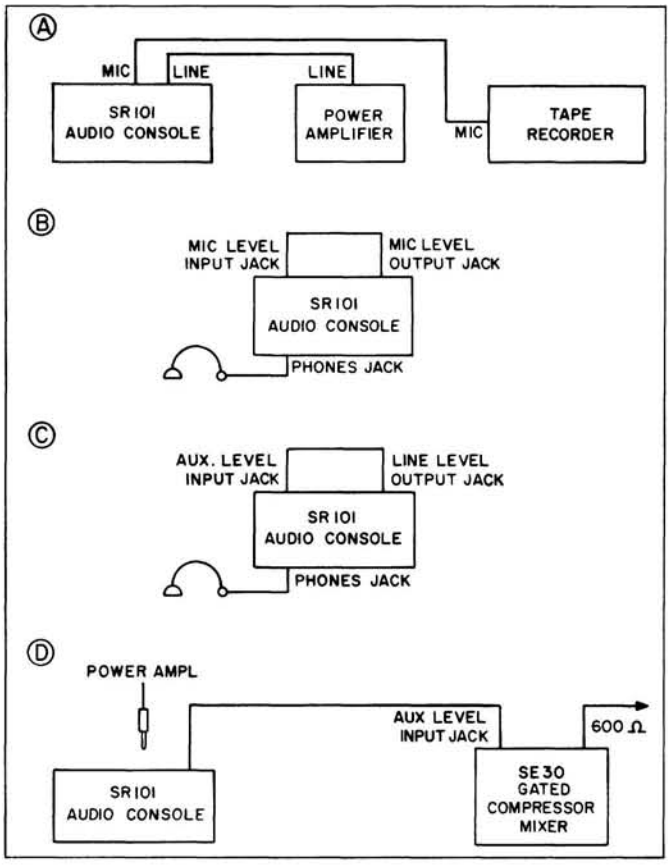


FIGURE 6. TONE OSCILLATOR APPLICATIONS

BASIC OPERATING HINTS

Should any difficulty be encountered in Console operation, the problem may often be traced to some simple source such as an error in interconnection. The following is offered as a basic guide to problems of this sort.

Symptom: Console is "dead" (no output, VU Meter lamps out)

Check:
1. Check that ac power source is "live" and that Console is plugged in.
2. Check that POWER ON-OFF Switch (19) is on.
3. Check to see that rear-panel 3AG-3/16A SLO-BLO Fuse (22) is good.

Symptom: Console is "dead" (no output, VU Meter lamps lit)

Check:
1. Check that PROGRAM Switch or Switches (13) are depressed.
2. Check that cable from PROGRAM OUTPUT/LINE LEVEL Connector (27) has not accidentally been connected to PROGRAM OUTPUT/MIC LEVEL Connector (24).
3. Check that PHASE Switch (26) is not between positions.
4. Check that external equipment is properly connected to LINK Jacks (28,31).

Symptom: One channel is "dead" (other channels operating properly)

Check:
1. Check for defective input cable or source.
2. Check that channel PROGRAM Switch (13) is depressed.
3. Check that AUX-MIC Switch (14) (channels 7 and 8 only) is not between positions or in the wrong position.

SR101 Series 2 Audio Console

SPECIAL OPERATING INSTRUCTIONS

The previous section described normal interconnection and operation of the SR101 Audio Console; this section provides information on special set-ups to more fully utilize the capabilities of the Console.

HIGH-IMPEDANCE MICROPHONES

Up to two high-impedance dynamic, ribbon or condenser microphones (crystal or ceramic microphones are not recommended) can be used with the Console without the need for line matching transformers simply by using the AUX. INPUT Jacks (32) on channels 7 or 8 and moving the corresponding INPUT ATTEN Switch (14) to AUX. NOTE: The very high output produced by some condenser microphones may be compensated for by proper setting of the INPUT ATTEN Control.

If a high-impedance microphone is to be used with one of the low-impedance MIC LEVEL Input Jacks (33), a line matching transformer (Shure A95 Series) must be used.

The high-impedance cable should be limited to 6.1m (20 ft.). If a long cable length is required, use up to 3.05m (10 ft.) of high-impedance, single-conductor, shielded cable (Belden #8401, #8410, or #8411) between the microphone and line matching transformer, and add as much low-impedance, two-conductor, shielded cable (Belden #8412, or #8422) as necessary between the transformer and Console input jack. These precautions will help avoid high-frequency signal loss and reduce the possibility of hum and noise.

MUSICAL INSTRUMENTS

Musical instruments, acoustical (non-electrified), acoustical-electrified, or electrified, may be amplified through the Console. For acoustical instruments, place a microphone close to the instrument strings, sounding board, or mouth. Adjust equalization, reverb and volume controls as necessary.

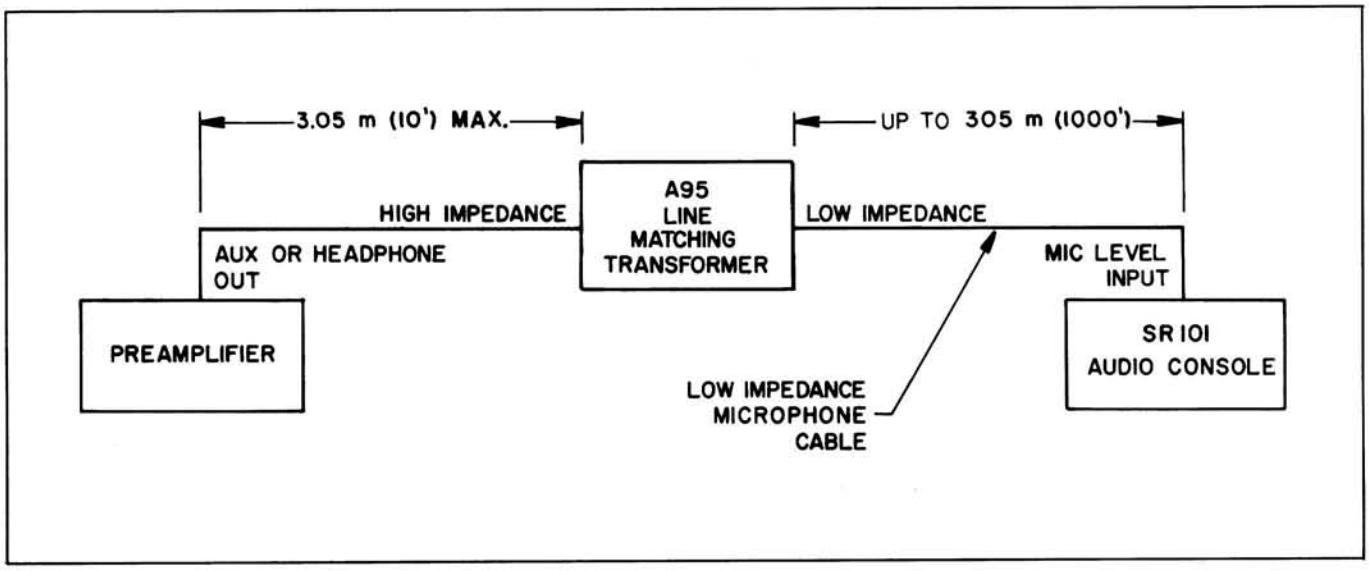


FIGURE 7. PREAMPLIFIER-CONSOLE CONNECTIONS

For acoustical-electrified instruments such as classic or folk guitars with pickups and preamplifier outputs, or pianos with pickups and preamplifier outputs, either place the microphone as described above, or connect the pickup to an AUX. LEVEL Input Jack (32) on the Console. If the cable from the instrument to the Console is greater than 6.1m (20 ft.), use a line matching transformer as described under *High-Impedance Microphones* (Page 11). This transformer also allows the instrument to be connected to channels 1-6. Adjust the Console INPUT ATTEN Control (14) for the channel in use to provide the desired sound level with the channel Volume Control (1) set at about mid-scale.

To use a preamplifier auxiliary output with the Console (instrument or tape recorder preamplifier, or hi-fi amplifier tape monitor output jack, or headphone jack; *never* speaker jacks), connect the preamplifier auxiliary output through up to 3.05m (10 ft.) of cable to the high-impedance side of a line matching transformer (Shure A95 Series) as shown in Figure 7, Page 11. Connect the low-impedance side of the transformer through a low-impedance microphone cable [up to 305m (1000 ft.)] to a Console MICROPHONE LEVEL Input Jack (33). Adjust Console equalization controls for optimum sound. Adjust the Console INPUT ATTEN Control (14) for the channel in use to provide the desired sound level with the channel Volume Control (1) set at about mid-scale.

Fully electrified instruments may also be amplified using a microphone in front of the instrument speaker, or the instrument output (*not* the speaker jack) may be fed directly to an input jack as described above. It is important to note that the tonal quality of fully electrified instruments is primarily formed by the instrument amplifier *and* speaker; an external microphone picking up the instrument speaker output may very well provide a more desirable sound than that obtained by direct connections.

The cable length restrictions applying to high-impedance microphones also apply to most musical instruments (see *High-Impedance Microphones,* Page 11).

TAPE RECORDING

The Console output may be recorded on a tape recorder from either the LINE LEVEL Output (25,27), MIC LEVEL Output (24) or LINK OUT (31) Jacks. The Console Program Outputs are *after* the FEEDBACK FILTERS (15) and MASTER Volume Control (20); the LINK OUT Jack is *before* these circuits. In considering a tape recorder connection, the operator should consider whether he wants the tape level to follow the MASTER Control.

To use a LINE LEVEL Output Jack feeding a high-impedance auxiliary tape recorder input, connect a cable from one LINE LEVEL Jack to the tape recorder input (see Figure 8, Page 12). If the LINE LEVEL Output is being used and a two-circuit phone jack is used to connect the Console to the tape recorder, this will unbalance the LINE LEVEL Output (refer to *Program Output,* Page 9).

If the MIC LEVEL Output Jack (24) is to be used, connect a cable from it to the tape recorder low-impedance microphone input. If the microphone input on the tape recorder is designed to be used with high-impedance microphones (greater than 1000 ohms), insert a line matching transformer (Shure A95 Series with proper connectors) between the MIC LEVEL Output Jack and the tape recorder input (refer to *Program Output,* Page 9).

To use the LINK OUT Jack (31), use a two-circuit phone plug on the cable to the tape recorder auxiliary or line input. The input impedance of the tape recorder should be 600 ohms minimum.

The low output impedance of the Console provides for unlimited cable length between the Console output and tape recorder input. Low-capacitance, single-conductor, shielded cable (Belden #8401, #8410, or #8411) is recommended to reduce the possibility of hum and noise pickup.

For operation with a stereo tape recorder, refer to *Stereo Operation,* Page 16.

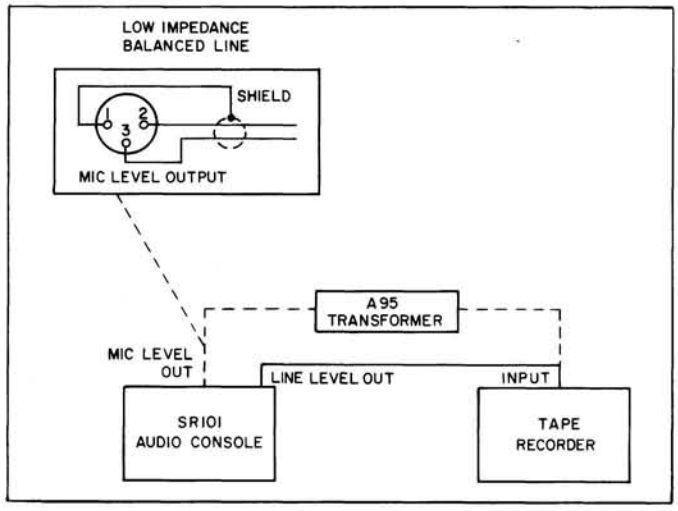


FIGURE 8. TAPE RECORDING

RECORD PLAYBACK

To play records through the Console using a turntable or record changer with a stereo magnetic cartridge and no preamplifier, the most expedient method is to join the left and right channel leads from the turntable in a "Y" adapter and connect the joined output to a channel 7 (or 8) AUX. LEVEL Input Connector (32) on the Console (see Figure 9A, Page 13). Note that the total lead length between turntable and Console should not exceed five feet. To approximate the RIAA equalization curve, set the Console FREQ EQ-LO Control (5) to +4, the FREQ EQ-HI Control (7) to —6, and the INPUT ATTEN Control (14) to 0 for the channel (7 or 8) being used. Adjust the channel Volume Control (1) as necessary.

A better method of performing this interconnection involves the use of a phono preamplifier such as the Shure M64 Stereo Preamplifier (see Figure 9B, Page 13). In this set-up, RIAA equalization will be achieved at the preamplifier, before the signal enters the Console. In this manner, the Console equalization controls may be used to optimize the room sound, rather than compensating for the input signal. The joined turntable leads enter the channel 1 input of the preamplifier, and the output is taken from the channel 1 low level output and fed to the channel 7 (or 8) AUX. LEVEL Input Jack (32) of the Console. Set the Console INPUT ATTEN Control (14) to 0 with this set-up.

Note also that this set-up removes the cable restriction between turntable and Console described above: although a maximum of 1.5m (5 ft.) between turntable and preamplifier is mandatory, the cable length between the preamplifier and Console is virtually unlimited.

TAPE PLAYBACK

To play tape-recorded material through the Console, connect a cable from the tape recorder auxiliary or line level output to the channel 7 or 8 AUX. LEVEL Input Jack (32). Turn the front-panel AUX-MIC Switch (14) on Channel 7 or 8 (whichever is being used) to AUX. Set the INPUT ATTEN Switch (14) to —20 to start, and adjust it and the channel Volume Control (1) as required.

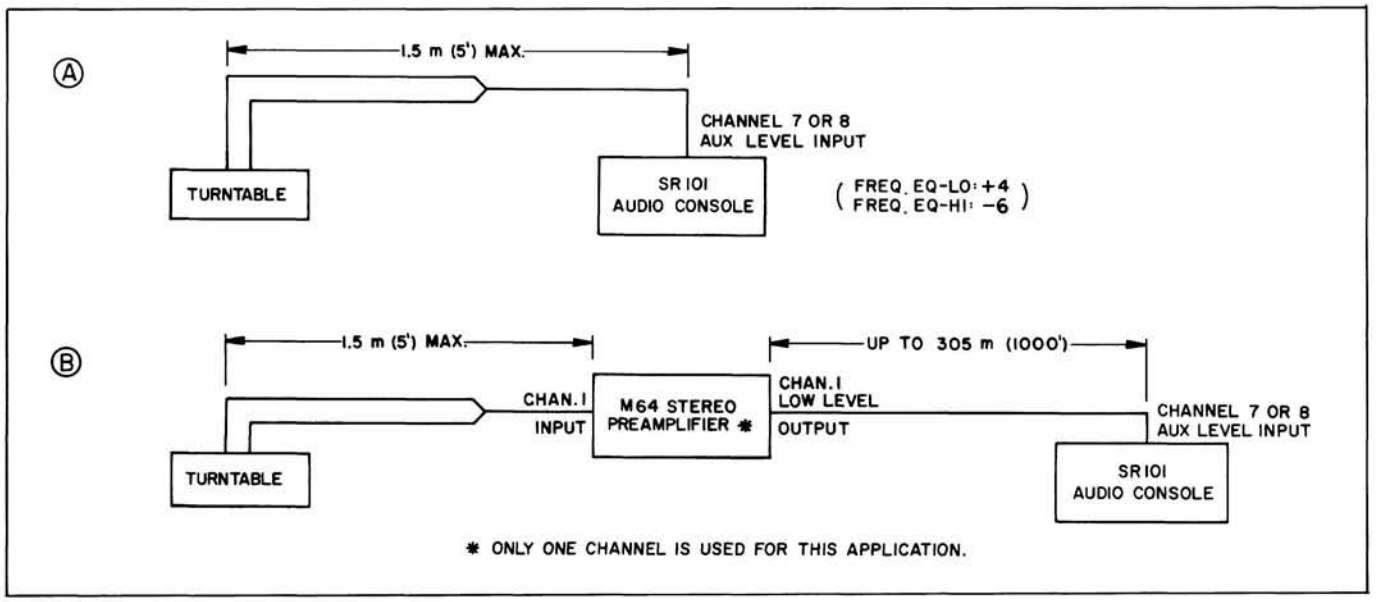


FIGURE 9. RECORD PLAYBACK

TALKBACK CIRCUIT

It is often necessary to provide a "talkback" circuit (or "intercom," or "com line") to enable the Console operator to instruct or cue performers, lighting control, announcers, etc. It also enables the operator to avoid hand or light signals which may not be visible during a performance. The talkback circuit requires the use of one input channel, removing that channel from use by performers. Note too that the monitor circuit is being used, preventing its use for other purposes.

To use low-impedance (not carbon) microphones, connect the microphone of a single headset-microphone to a Console MIC LEVEL Input Jack (33) (see Figure 10, Page 13). Connect the headset to the front-panel PHONES Jacks (8). For high-impedance headphones, connect to the rear-panel MONITOR LINE LEVEL Jack (30). Additional headsets may be connected through "Y" adapters to the PHONES or MONITOR LINE LEVEL Jack. If additional microphones are to be connected, "Y" adapters (Switchcraft 391Q13, 391Q53 or equivalent) should be used to connect these to the MIC LEVEL Input Jack. Depress the MONITOR Switch (12) for the talkback channel and adjust the MONITOR Level Control (10) as desired. Do not depress the PROGRAM Switch (13).

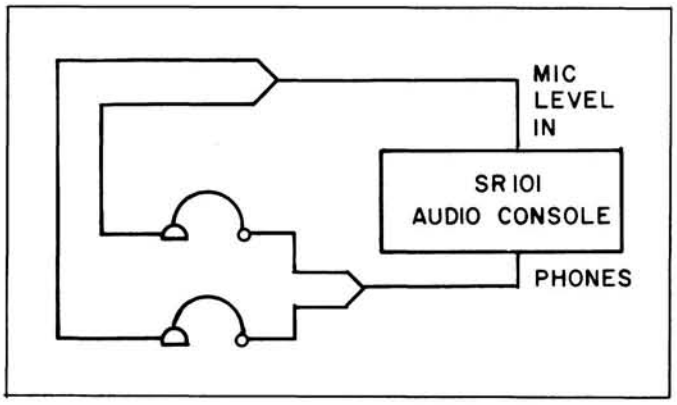


FIGURE 10. TALKBACK CIRCUIT

If this set-up does not work, and the microphone type being used is unknown, it is possible that it is a carbon microphone. To use carbon microphones such as found in Western Electric-type operator's headsets, a battery power supply is required to power the microphone (see Figure 11, Page 13). A common battery may be used for powering a number of carbon microphones, though each microphone requires its own 100-ohm resistor and Shure A95 Series line matching transformer.

Should a large number of headphones be required, a power amplifier or headphone distribution amplifier should be inserted in the headphone circuit between the MONITOR LINE LEVEL Output (30) and the distribution amplifier input.

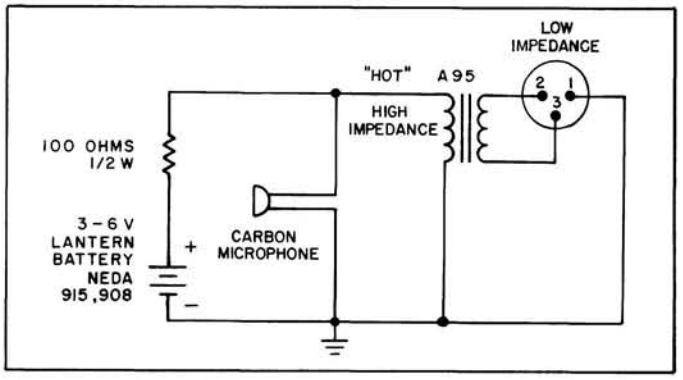


FIGURE 11. CARBON MICROPHONE POWER SUPPLY

ADDITIONAL MIXER INPUTS

Additional microphone or other source inputs may be obtained using a high gain, low noise, microphone mixer such as the Shure M68FC. When connected to a MIC LEVEL Input Jack (33), the M68FC and SR101 Audio Console will provide a total of 11 inputs (see Figure 12A, Page 14). (Note that adding a mixer at an Input Jack converts that channel to a submaster control; the total number of inputs will thus be the mixer total plus the Console total — 8 — minus 1 for the submaster.)

A common practice when adding a mixer in this manner is to connect similar-use microphones (for instance, all drum, string or horn microphones) to a single mixer which is fed into the Console. The Console individual channel Volume Control (1) then controls an entire section, facilitating adjustment of that section during a performance. With this set-up, set the channel INPUT ATTEN (14) to 0 and adjust the mixer volume controls in the mid-to-high range; adjust the mixer master volume control as required to keep the Console volume control in the desirable middle range.

The M68FC mixer has a switch-selectable low- or high-impedance microphone output. When using an M68FC-type mixer into a Console MIC LEVEL Input Jack (33), set the mixer MIC OUT switch to low impedance, and make necessary adjustments as described above. It is sometimes desirable to use the auxiliary output from the mixer into the Console channel 7 (or 8) AUX. INPUT Jacks (32) if the mixer output is derived from a source which is not required constantly (such as an orchestra); the same channel 7 (or 8) MIC LEVEL Input Jack can be used as a regular microphone input, with the front-panel AUX-MIC Switch (14) selecting one or the other for the program. (Refer to *Input Channels,* Page 5, for a description of the AUX-MIC Switch function.)

To use this set-up with an M68FC mixer, connect a cable between the mixer auxiliary output (phono pin jack) and the Console AUX. INPUT Jack (32) on channel 7 (or 8) (phone jack) (Figure 12B, Page 14). Set the Console INPUT ATTEN Control (14) to —20. To use this set-up with other mixers, essentially the same procedure is followed. The Shure M67 mixer, for instance, may be connected to the Console AUX. INPUT Jack through the mixer line out connector (binding posts) or headphone output (phone jack) (Figure 12C, Page 14). Because of the difference in outputs between the M68FC and M67, the Console INPUT ATTEN Control, when used with the M67, should be set at —30. Note that the M67 microphone output should not be used into the Console AUX. INPUT without a line matching transformer.

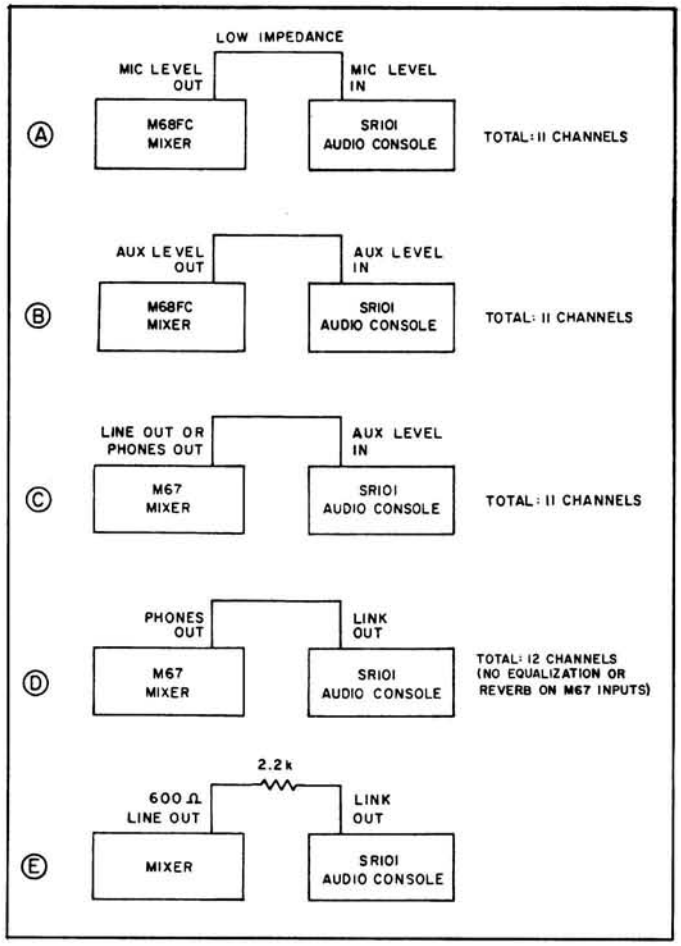


FIGURE 12. ADDITIONAL MIXER INPUTS

If a mixer is to be used with the Console but it is desirable to maintain as many Console channels as possible, the mixer *can* be connected to the Console LINK OUT Jack (31) (Figure 12D, Page 14). However, this requires sacrificing the channel reverb, equalization and monitor functions for the sources entering through the mixer (monitoring of the *total* program can still be accomplished with the POST LINK/PRE LINK Switch (29) set to POST LINK). The only Console control functions operating on the mixer sources in this set-up are the MASTER Volume Control (20), FEEDBACK FILTERS Switches (15), and rear-panel PHASE Switch (26). In addition, any mixer used in this set-up requires a 2.2-kilohm resistor in series with the mixer output to provide an attenuator bridging connection; the resulting signal level will be down —10 dB (see Figure 12D, Page 14). The M67 Mixer headphone jack has suitable built-in resistors and may be connected directly to the Console LINK OUT Jack. Only mixers with 600-ohm line outputs may be used in this configuration. Note that the Shure M68FC mixer cannot be used this way.

The mixer-to-link jack connection can also be used with several mixers. Each mixer output must contain its own 2.2-kilohm resistor prior to being joined in a "Y" adapter.

Any number of M67 mixers may be interconnected by connecting their headphone jacks in parallel. The paralleled headphone output is then connected to a Console AUX. LEVEL Input Connector (32). The INPUT ATTEN Control (14) should be set at —20 as an initial position and adjusted in balance with the M67 meter reading and the channel 7 (or 8) Console Volume Control setting (1). In this set-up the M67 VU meter switch should be set at +4, the master volume to 3, and the individual volume controls to 7 or 8.

ADDITIONAL CONSOLE INPUTS (TWO CONSOLES)

A total of 16 microphone inputs can be obtained using two Consoles in a common mix mode. Connect a cable to the "slave" Console LINK OUT Jack (31) and to the "master" Console LINK OUT Jack (Figure 13A, Page 15). Note that the LINK OUT Jack is both an input *and* output jack. This interconnection provides a two-way path between the two Consoles. When operating the two Consoles side by side, the slave input can be monitored on the master Console as part of the total program output with the POST LINK/PRE LINK Switch (29) set to POST LINK and the PROGRAM MONITOR Switch (11) depressed. With the POST LINK/PRE LINK Switch in the PRE LINK position the Program Monitor only monitors the eight inputs on that Console. The monitor point is switched ahead (PRE) of the LINK Jacks. In this set-up both Consoles contain the total program mix. Each Console MASTER Volume Control (20) is independent, and may be used to control two separate program outputs.

An expansion of this method of interconnecting two Consoles which will enable full monitoring involves the sacrifice

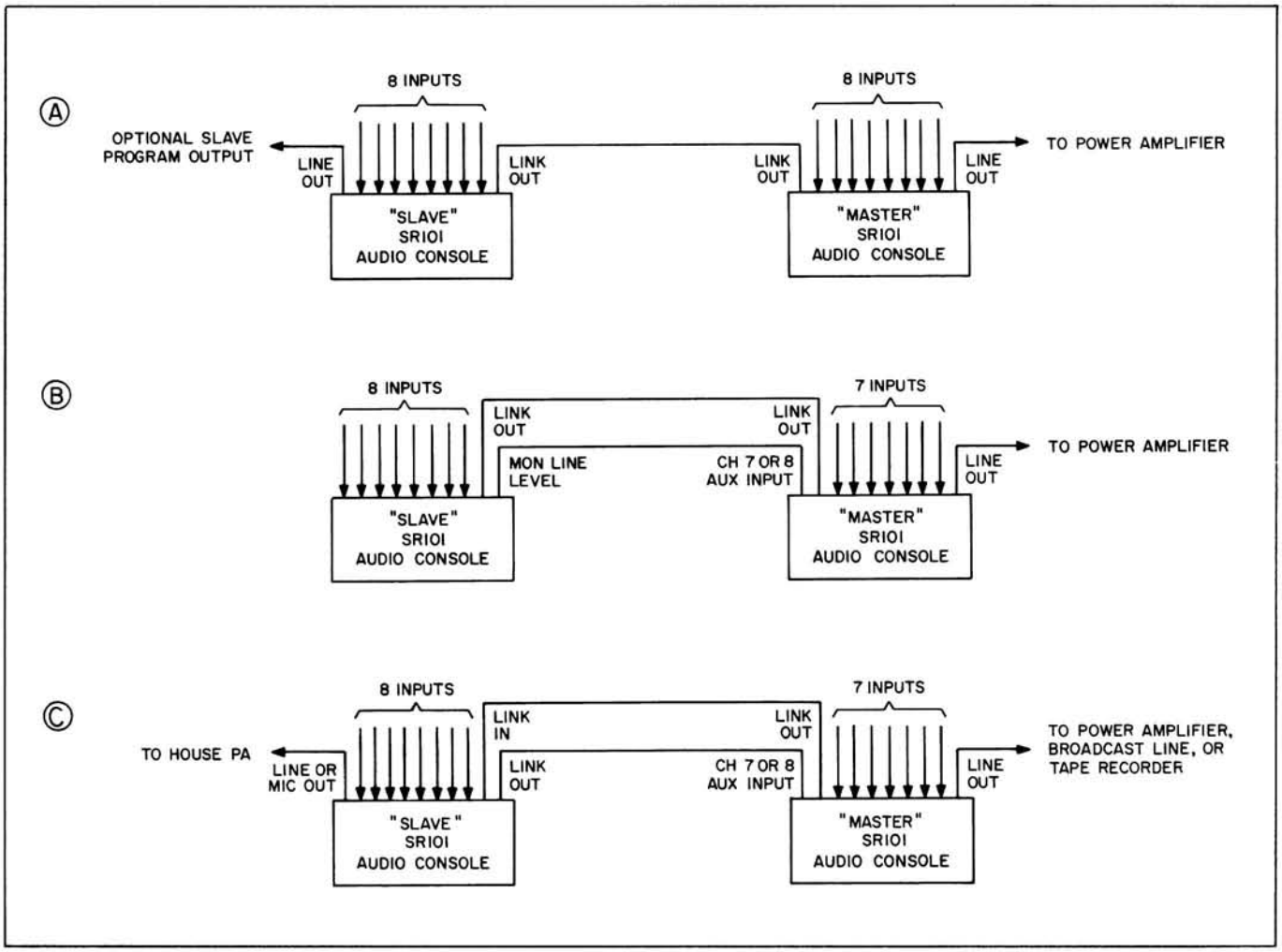


FIGURE 13. ADDITIONAL INPUTS: TWO CONSOLES

of one master Console input channel (Figure 13B, Page 15). Connect a cable between the master Console channel 7 (or 8) AUX. INPUT Jack (32) (phone jack) and the slave Console rear-panel MONITOR LINE LEVEL Output Jack (30) (phone jack). Set the master Console channel 7 (or 8) INPUT ATTEN Control (14) to —30, channel Volume Control (1) to mid-range, and channel PROGRAM Switch (13) to off. To monitor, for instance, channel 2 on the slave Console, depress the slave channel 2 MONITOR Switch (12), release the PROGRAM MONITOR Switch (11), and preset the channel 2 Volume Control to mid-range. On the master Console, depress the MONITOR Switch for channel 7 (or 8), and release the PROGRAM MONITOR Switch. With the master Console MONITOR Level Control (1) previously adjusted for normal listening, adjust the slave Console MONITOR Level Control for the same level.

The interconnections used in the above paragraph may also be used in a set-up where the slave Console is to feed a built-in, or "house" PA (Figure 13B, Page 15). In this set-up, the master Console feeds the portable power amplifier and speakers, or a broadcast line feed, or a tape recorder. Connect the slave Console program output, either LINE LEVEL (25,27) or MIC LEVEL (24) to the input of the "house" PA. The master Console MASTER Volume Control (20) will control the portable system speakers; the slave Console MASTER or channel Volume Controls (1) will control the "house" speakers. Note that this set-up provides total *or* selective channel monitoring from the slave Console at the master Console.

A different set-up that uses the slave Console as a submaster is made by connecting the slave Console LINK OUT Jack (31) to the master Console channel 7 (or 8) AUX. INPUT Jack (32) and the slave LINK IN Jack (28) to the master LINK OUT Jack (31) (refer to Figure 13C, Page 15). In this set-up the total mix from the slave Console enters channel 7 (or 8) on master Console channels and may be monitored from the master Console; individual slave Console channels must be monitored from the slave Console monitor system. This set-up is helpful when an orchestra (or band) is mixed on the slave Console. The channel 7 (or 8) Volume Control on the master Console provides a single control (submaster) to mix the total orchestra sound with the vocals. The result is that the two MASTER Volume Controls (20) provide two independent outputs, each with the total program mix and each with separate equalization adjustments.

Note that two Shure SR110s may be added to provide a monitor output for the 16 inputs.

REDUNDANT CONSOLE SET-UP (TWO CONSOLES)

Two Consoles can be connected in parallel such that certain types of failure in one will not cause the loss of channels connected to that Console; in a failure in the

output of one Console, the channel inputs of both units will be routed through the operative Console. This type of system is termed "redundant," that is, the reliability of the system is enhanced through parallel functioning devices.

Connect a cable between the LINK OUT Jacks (31) of each Console. Construct a resistor network as shown in Figure 14, Page 16, and insert it between the LINE LEVEL Output Jacks (27) on both Consoles and the balanced bridging input of the power amplifier. The resistor network matches the output of the two Consoles to the balanced line to the power amplifier.

A method of *total* redundancy using two Consoles is to parallel-connect ("Y") all inputs using Switchcraft 391Q13, 391Q53 or equivalent adapters. The second (redundant) Console may be kept on with all Volume Controls (1,20) down, and the required controls brought up to the desired level only upon failure of one channel. The same output attenuator network as described above is required.

STEREO OPERATION

Stereo operation, for PA or tape recording purposes, may be accomplished in several ways. The most common are described in the following paragraphs.

Stereo operation is most easily achieved using the set-up previously described in *Monitor Mixer System,* Page 8. The use of Shure SR110s as shown in Figure 5, Page 9, provides for a stereo tape recorder mix which is separate from the PA and stage monitor mixes.

Stereo operation may obviously be obtained by using two Consoles in separate PA systems without any system interconnections. If it is desired to have one microphone connected to both systems, use a "Y" adapter (Switchcraft 391Q13, 391Q53 or equivalent) on the microphone and feed its output to a MIC LEVEL Input Jack (33) on each Console. To record stereo tapes with this set-up, connect the LINE LEVEL Output Jack (25) on one Console to the left input channel of a stereo tape recorder and the LINE LEVEL Output Jack on the other Console to the right input channel.

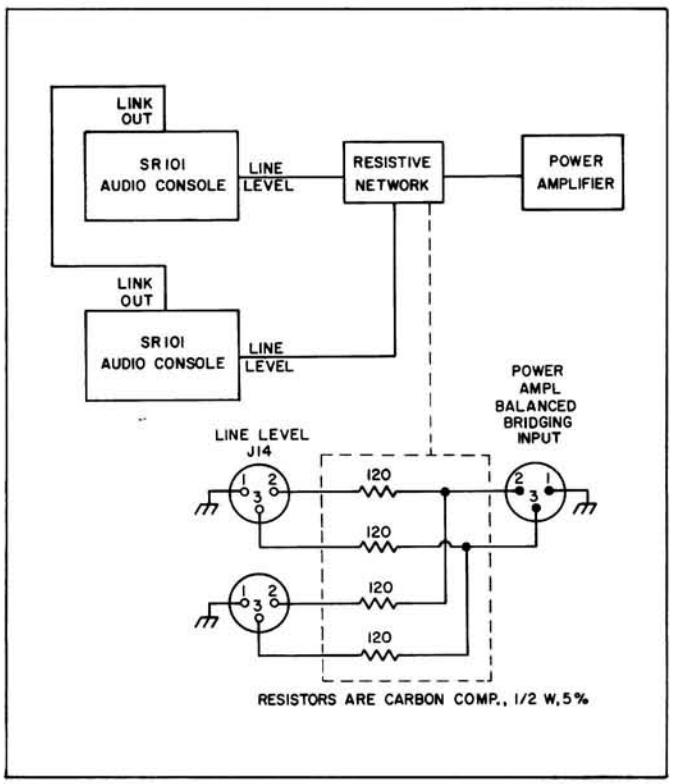


FIGURE 14. REDUNDANT CONSOLES

An alternate method of stereo operation using only a single Console involves the use of the program output system as one stereo channel (right) and the monitor output system as the other channel (left). With microphones placed for stereo effect, connect a PROGRAM LINE LEVEL Output Jack (25) to the right power amplifier and speaker set (or the right channel input of a stereo tape recorder), and the MONITOR LINE LEVEL Output Jack (30) to the left power amplifier and speaker set (or the left channel input of the stereo tape recorder). Depress the channel PROGRAM Switches (13) for the microphones assigned to the right, and depress the MONITOR Switches (12) for microphones assigned to the left. Release the PROGRAM MONITOR Switch (11). Center microphones may be assigned to both left and right channels by depressing both PROGRAM and MONITOR Switches for those inputs. Note that the channel MONITOR Switches should be preset and not changed during a performance because the total MONITOR level changes as a function of the number of inputs assigned to the MONITOR system. Also note that reverb is obtainable only on those inputs whose PROGRAM Switches are depressed. This set-up works well for stage plays where the left and right speakers are closely spaced, such as to the sides of a narrow stage, and are projecting into a deep room. Shure speaker columns are an ideal speaker choice because of their wide horizontal coverage pattern.

A convenient method of stereo recording is to record the vocals on one tape channel and the instruments on the other. For this set-up, connect either the Console MIC LEVEL (24) or LINE LEVEL (25) Output Jack to one channel input of a stereo tape recorder (refer to *Tape Recording,* Page 12). Connect a microphone to the remaining tape channel input; an omnidirectional unit suspended from the ceiling will pick up the full acoustic output of the instruments.

An expansion of the stereo recording set-up described above—separate vocal and instrument channels—depends on whether the stereo tape recorder to be used has a single set of inputs (MIC) or whether it also has auxiliary (AUX) inputs with separate volume controls. With microphone and auxiliary inputs, connect the system as shown in Figure 15A, Page 17. Place the vocal microphones as required and connect them to the MIC LEVEL Input Jacks (33) of the Console. Connect the LINE LEVEL Output Jack (25) through a "Y" adapter to the auxiliary inputs of the tape recorder. Place the instrumental microphones as required and connect them to the microphone inputs of the tape recorder.

If the stereo tape recorder has a single set of inputs, that is, when the auxiliary inputs are connected, the microphone inputs are disconnected, or if separate volume control of the microphone and auxiliary inputs cannot be maintained, then a stereo mixer such as the Shure M688 may be used to combine the Console output prior to entering the recorder (refer to Figure 15B, Page 17). Place the vocal microphones and connect them to the Console MIC LEVEL Input Jacks (33). Connect the Console MIC LEVEL Output Jack (25) to the MIC 4 input of the M688. Place the instrumental microphones as desired and connect them to the MIC 1 (left) and MIC 2 (right) inputs of the M688. Connect

the left and right auxiliary outputs of the M688 to the auxiliary inputs of the tape recorder. Before making recordings, adjust the M688 MIC 4 slide control to a mid-position for the most desirable balance of vocal microphone levels.

REMOTE VOLUME CONTROL

A remote volume control may be constructed for adjusting the output level at a considerable distance from the Console. For remote control up to 50 feet, obtain a linear-taper potentiometer with knob (any value from 1000 to 2500 ohms), a standard phone plug, and a length of single-conductor, shielded microphone cable (such as Belden #8401, #8410, or #8411). Connect the potentiometer and plug as shown in Figure 16A, Page 17, and connect the phone plug to the Console LINK OUT Jack (31).

If hum or noise is encountered with the above set-up, it may be necessary to provide a two-wire control. Using the same potentiometer, obtain two standard phone plugs and twice the desired length of single-conductor, shielded microphone cable. Connect the potentiometer and plugs as shown in Figure 16B, Page 17, and plug the control assembly into the LINK OUT (31) and LINK IN (28) Jacks.

For distances over 15.2m (50 ft.) or for permanent installations where hum or noise may be encountered, use low-capacitance, two-conductor, shielded cable (Belden #8412 or #8422). Connect as shown in Figure 16C, Page 17, and use a metal box to contain the potentiometer. The cable shield must be connected to the metal box containing the potentiometer, to the common conductor (black), and not to the sleeve connections of the phone plugs. IMPORTANT: To avoid hum caused by a ground loop, *do not ground* the metal box to any metal such as electrical conduit, water pipes, heating ducts, or structural steel.

TELEPHONE LINE SURGE PROTECTION

When using the Console to feed a telephone line that may be subject to lightning-induced voltage surges, the following part should be installed across the telephone line to provide additional protection for output circuit components: Thyrector, General Electric Part No. 6RS20SP1B1.

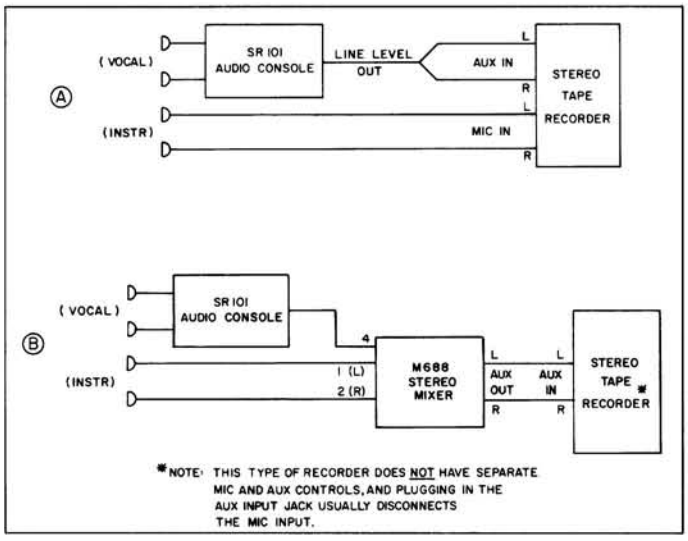


FIGURE 15. STEREO TAPE RECORDING

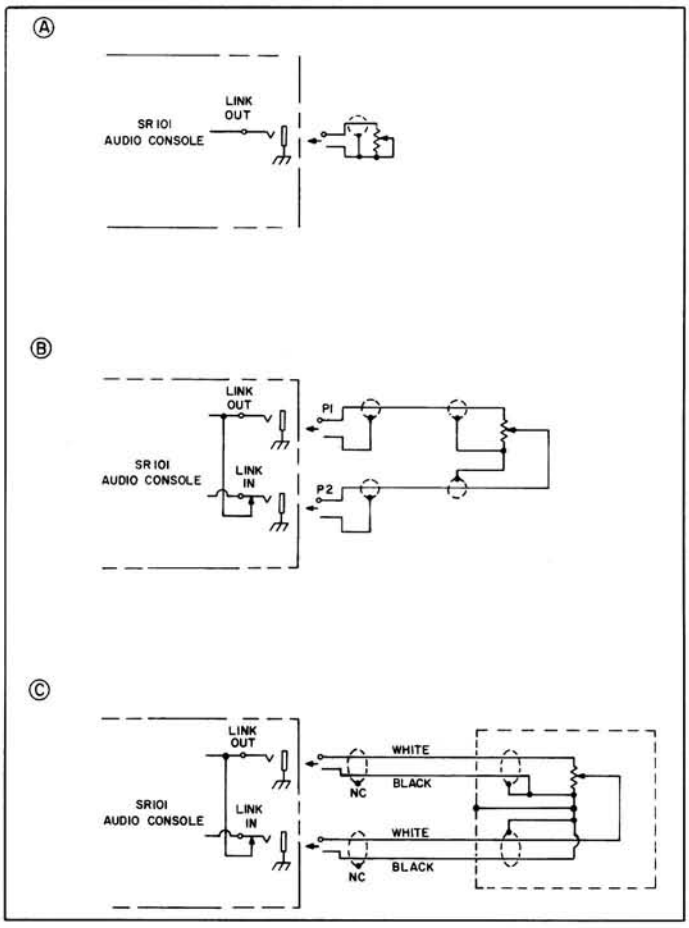


FIGURE 16. REMOTE VOLUME CONTROL

SR101 Series 2 Audio Console

SERVICE INSTRUCTIONS

CONSOLE SERVICE (SEE GUARANTEE, Page 22.)

The SR101 Audio Console uses components of the highest quality, operating well within their respective ratings to assure long life.

WARNING

Voltages in this equipment are hazardous to life. Make all input and output connections with ac power disconnected. Refer servicing to qualified service personnel.

REPLACEMENT PARTS

Parts that are readily available through local electronic parts distributors are not shown on the accompanying Parts List. Their values are shown on the Circuit Diagram (Figure 31, Pages 44-45). Commercial parts not readily available and unique parts are shown on the Parts List and may be ordered directly from the factory.

The commercial alternates shown on the Parts List are not necessarily equivalents, but may be used in the event that direct factory replacements are not immediately available. To maintain the highest possible performance and reliability Shure factory replacement parts should be used. When ordering replacement parts, specify the Shure Replacement Kit Number (RKC), description, product model number, and serial number.

FUSE REPLACEMENT

To replace line fuse F1 (with no apparent problems in the Console), disconnect the line cord from the ac source and remove the rear-panel fuseholder cap. Replace the defective fuse *only* with a 3AG-3/16A Slo-Blo fuse (SR101 only; SR101-2E contains a 0.1A Slo-Blo fuse for 180- to 250-volt operation, or a 0.2A Slo-Blo fuse for 90- to 132-volt operation).

CAUTION

If trouble symptoms—overheating, erratic operation, etc.—were apparent before the fuse blew, or if the replacement fuse blows, a qualified serviceman should troubleshoot the Console carefully to find the source of the trouble. Do not continue to replace fuses until the trouble has been corrected.

The Console also contains two wired-in fuses, one in series with rear-panel line fuse F1 (F2, 3/10A, Slo-Blo) and one in the meter and accessory lamp circuit (F3, 1A, Slo-Blo). If replacement becomes necessary, replace only with identical fuses.

KNOB REPLACEMENT

All front-panel control knobs are pull-off types and are interchangeable with others of the same function. The only exceptions are the channel 7 and 8 INPUT ATTEN Switches (S7,S8) which contain separate AUX-MIC knobs. When ordering replacement knobs, be sure to order the proper color-coded type for the desired control.

SERVICE ACCESS

To open the Console for servicing, carefully place the Console front-panel downward on a firm, flat, padded surface. A rubber, plastic, corrugated cardboard, or cloth pad should be placed between the work surface and the Console controls. Remove the three Phillips head screws securing the upper and lower rear panels to each other, the four Phillips head screws securing the lower rear panel to the Console sides, and the two Phillips head screws securing the upper rear panel to the Console sides. Open the two halves to the limit of their hinges (lower half first) to obtain access to the printed circuit boards (NOTE: Although not normally required for servicing, the lower panel may be completely removed from the Console by removing two hex-head screws, one at either side of the Console case, and disconnecting the black ground lead.)

LAMP REPLACEMENT

To replace either of the two #47 lamps (PL1,PL2) illuminating the VU Meter (M1), carefully raise the metal clip assembly holding the lamp to be replaced upward and off the Power Supply printed circuit board bracket. Lift the lamp socket upward, taking care not to crimp or break any associated wiring. Replace the defective lamp and carefully return the lamp assembly to its original position.

REVERBERATION ASSEMBLY

To remove the Reverberation Assembly (A10), first disconnect the input, output and ground leads. Remove the four Phillips head screws securing the assembly to the lower rear panel and remove the assembly. If the Console is to be operated with the Reverb Assembly removed, make sure the associated wires are not left free to short out any other wiring. Remove the input and output wires from the Reverb Spring Amplifier circuit board, and remove the ground wire from its lug.

BOARD REMOVAL

The various printed circuit boards are mounted in different manners. The following paragraphs describe the best method of removing these boards after wires and cable assemblies have been removed. *IMPORTANT:* When disconnecting push-on terminals or soldered board connections, make sure each wire is identified for proper reconnection. This may be done by affixing a piece of masking tape marked with the connection or terminal letter or color to each wire.

CAUTION

Push-on terminals must be removed by pulling terminals straight up from printed circuit board surface. Do not apply side force when removing or reconnecting terminals, or damage may result.

Refer to Figure 17, Page 19, for location of each board.

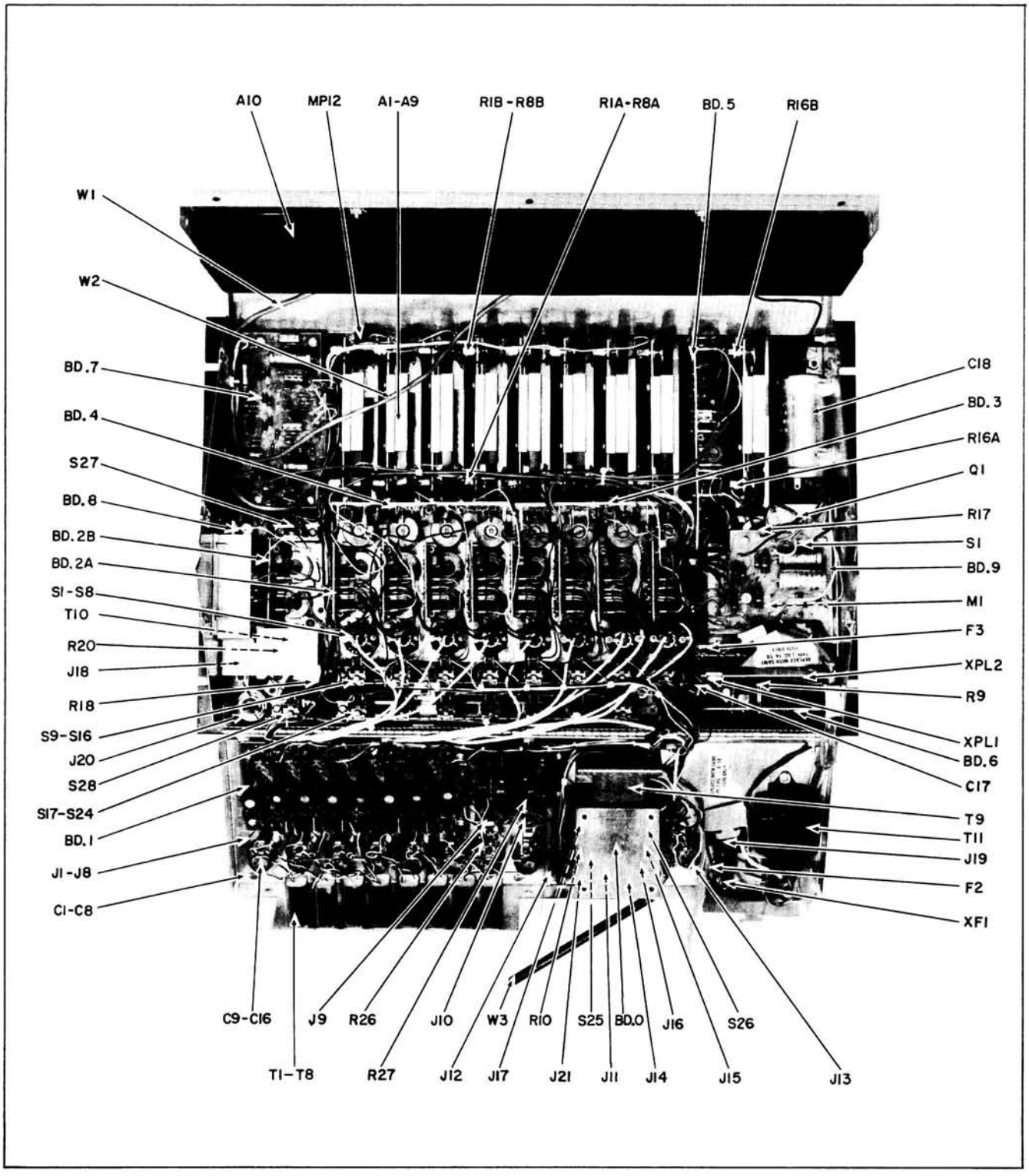


FIGURE 17. PRINTED CIRCUIT BOARD AND PARTS LOCATION

The function of each board assembly is defined in the table below.

Board No.	Function	Component Numbering
1	Preamplifier Board	100's
2A	Equalizer Boards (8)	200's
2B	Reverb Equalizer Board	200's
3	Program Mix Amplifier Board	300's
4	Reverb Mix Amplifier Board	400's
5	Program Output Board	500's
6	Feedback Filters Board	600's
7	Reverb Spring Amplifier Board	700's
8	Monitor Board	800's
9	Power Supply Board	900's
0	Program Mute Board	90's

A magnetic screwdriver is recommended for board fastener removal. When removing front-panel control or switch retaining nuts with a ½" nutdriver or wrench, be careful not to damage the black plastic surface.

Preamplifier Board (1): Remove the seven screws securing the board to the upper rear panel, disconnect the eight color-coded channel output leads, and lift the board up and over for service access. When re-fastening the board, be careful not to crimp wires or wiring assemblies beneath the board.

Channel and Reverb Equalizer (Board 2): Each of these nine boards may be removed by removing the two front-panel equalizer control knobs and retaining nuts associated with that channel. The eight Channel Equalizer boards (not the Reverb Equalizer board) are identical and may be interchanged without modification.

Program Mix Amplifier (Board 3): Remove the four front-panel REVERB INTENSITY Control knobs and retaining nuts for channels 5 through 8, and lift the board straight up.

Reverb Mix Amplifier (Board 4): Remove the four front-panel REVERB INTENSITY Control knobs and retaining nuts for channels 1 through 4, and lift the board straight up.

Program Output (Board 5): Remove the three screws securing the board to the front panel and lift straight up. (NOTE: The VU Meter Calibration resistor (R529) is accessible without removing the board.)

Feedback Filters (Board 6): Remove the two screws securing the filter switch frame to the front panel and lift straight up. Be careful not to damage the electrostatic foil shield when removing or inserting board.

Reverb Spring Amplifier (Board 7): Remove the four screws securing the board to the front panel and lift straight up.

Monitor (Board 8): Remove the two side-panel screws securing the bracket above the Monitor board. Remove the two screws securing the board and lift the board straight up.

Power Supply (Board 9): Remove the four screws securing the board and lift straight up.

Program Mute (Board 0): Remove the two screws securing the bracket on which transformer T9 and the Program Mute board are mounted. Turn the bracket so that the four screws securing the Program Mute board can be removed. When replacing the board, be sure to pass the same wires between the board and bracket as were removed.

VU METER REMOVAL

If the VU Meter (M1) requires replacement, remove it as follows. Disconnect all push-on terminals on the Power Supply board (Figure 17, Page 19). Remove the two screws securing the Power Supply bracket to the side panel. Swing the Power Supply bracket to one side, exposing the VU Meter. Remove the two wires connected to the VU Meter. Remove the two screws in recessed slots near the meter electrical contacts; this will free the meter retaining brackets, bracket screws, and rubber feet. Carefully pass the meter assembly *out through the front panel.* To reassemble the meter, reverse the above steps, taking care to insert the bracket screws in the closed-end eyelets in the rubber feet and tighten them as necessary to retain the meter against the front panel.

CAUTION

Do not overtighten screws so as to deform meter retaining brackets.

Make sure the red and green leads from transformer T11 are positioned *behind* the electrostatic foil shield flap attached to the Feedback Filters board.

VU METER CALIBRATION

With the Console turned off, the front-panel VU Meter (M1) should read 0 on the lower of the two meter scales. If it does not, adjust the screw below the meter face to obtain the correct reading.

To calibrate the meter, connect an ac voltmeter across the PROGRAM LINE LEVEL OUTPUT (J14-J16). Turn on the Console and adjust the TONE OSC LEVEL Control (R9) and the MASTER Volume Control (A9) until a reading of +4 dBm (1.228V across 600 ohms) is obtained on the voltmeter. Turn the front-panel METER SENSITIVITY Control (R17) to the CALIBRATE position. Adjust potentiometer R529 (VU Calibrate) on the Program Output board until the VU Meter reads 0 on the upper of the two scales.

Note that the VU Calibrate potentiometer range allows the VU Meter to be adjusted to 0 for any output between 0 dBm and +8 dBm.

VOLUME CONTROL ASSEMBLY

To replace a channel or MASTER Volume Control assembly (A1-A9), proceed as follows. Pull off the front-panel slider knob for the assembly to be replaced. Unsolder the leads connected to each potentiometer in the assembly, noting each lead connection. (Note that the lower potentiometer—"B" section—utilizes only two of the three leads.) Remove the two screws and lockwashers securing the assembly to the front panel. Carefully lift the Volume Control assembly up and out of the unit. Replace the new assembly by reversing the above steps.

To replace the black plastic dust cover (MP12) surrounding the Volume Control assembly (see Figure 18, Page 21), remove the assembly as described in the paragraph above. Remove the original dust cover by lifting both ends off the slide actuator and sliding the dust cover out from beneath the guide attached to the side of the mounting bracket opposite the actuator. Attach one end of the new dust cover to the slide actuator and pass the other end over the lower black plastic bearing assembly. Insert the loose end between the metal guide and synchronizing

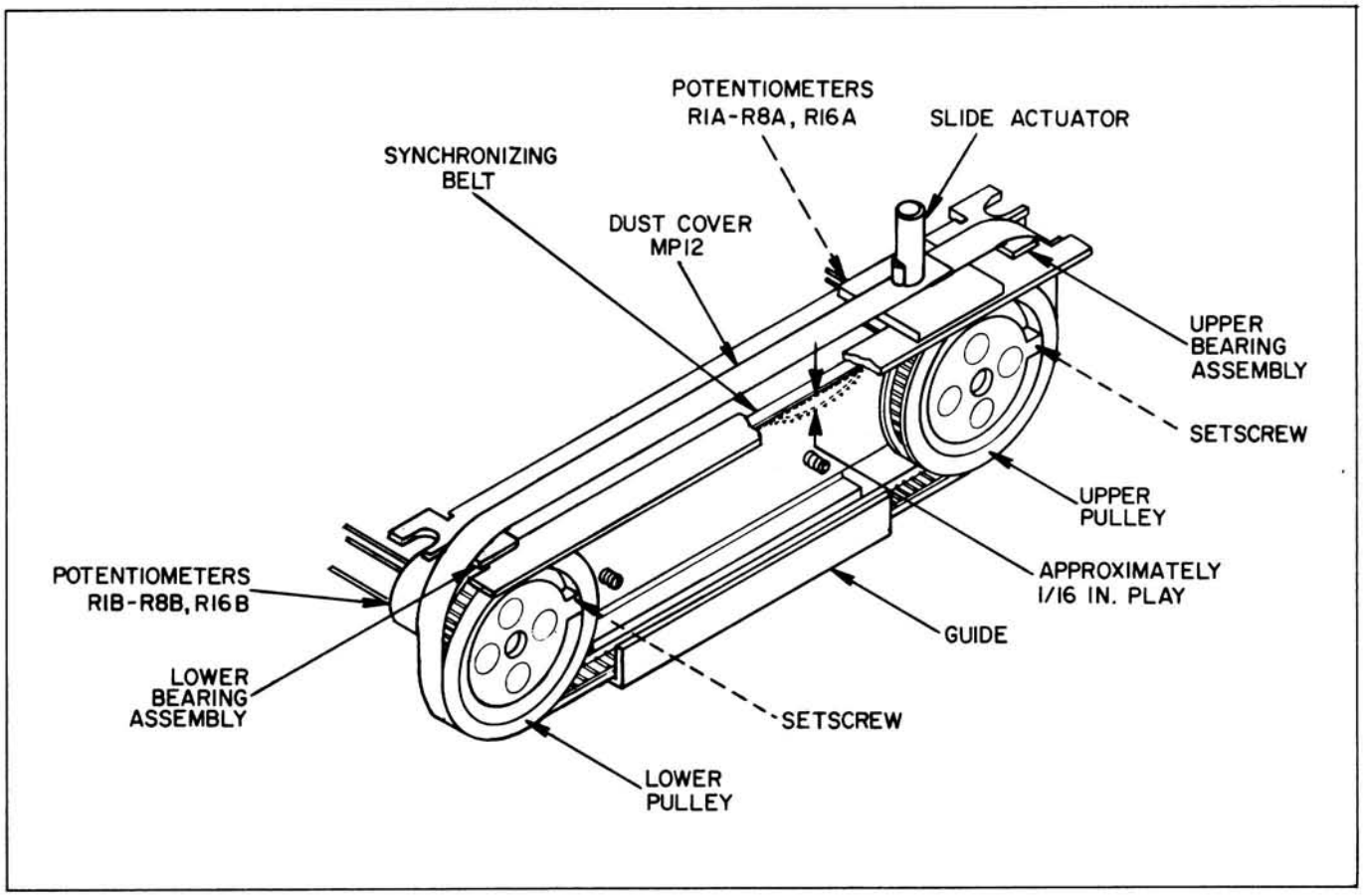


FIGURE 18. VOLUME CONTROL ASSEMBLY

belt, pass it over the upper black plastic bearing assembly, and attach it to the slide actuator. Reassemble the Volume Control assembly as described above.

To replace one of the linear volume potentiometers (R1-R8: individual channels; R16: MASTER), remove the assembly and dust cover as described above. Using an 0.050″ Allen wrench, loosen and remove the pulley attached to the potentiometer to be replaced and the synchronizing belt. (NOTE: The upper potentiometer is the "A" section and the lower is the "B" section for each Volume Control assembly.) Use a ⅜″ wrench to remove the old potentiometer. Position the new potentiometer in the mounting bracket, leads extending away from the actuator side of the assembly, and finger-tighten the ⅜″ mounting nut. From the potentiometer shaft side of the assembly and with the actuator upward, rotate both potentiometer shafts clockwise (from shaft side) to their stop positions. Note the setscrew position on the remaining pulley. Carefully insert the removed pulley, washer side toward mounting bracket, with the setscrew facing in the same direction as the setscrew on the other pulley. Slip on the synchronizing belt over the two pulleys.

Before tightening the ⅜″ nut on the replaced potentiometer, position the upper potentiometer to provide about 1/16″ (1.6 mm) play in the belt. The upper potentiometer is adjustable to set synchronizing belt tension: if the lower potentiometer has been replaced, tighten the lower potentiometer and loosen, adjust and tighten the upper potentiometer. If the upper potentiometer has been replaced, adjust it for proper belt tension, and tighten. (NOTE: The simplest method providing proper belt play is to hold the assembly by the mounting frame vertically with the actuator resting on the platform of a small postal scale or attached to a small spring scale, and move the assembly downward. A 1 pound maximum—approximately 454 grams—force should be required to move the actuator.) When the potentiometer is properly positioned, tighten the ⅜″ mounting nut. Make sure the replaced pulley is aligned with the center of the nearest black plastic bearing assembly and tighten the pulley setscrews. Move the actuator along the length of its travel. The actuator should move smoothly from one end to the other. If it stops before reaching the end of its normal movement, gently but firmly force the actuator to "jump" as many teeth as necessary to reach the end. Replace the black plastic dust cover and the entire assembly as described in the first two paragraphs of this section.

PARTS REMOVAL

Access to certain parts in the Console is not always apparent due to the large number of parts and assemblies, and the requirements for their placement. The following information is given to help locate and gain access to these parts (see Figure 17, Page 19).

PHONES Jack (J18), transformer T10 and MONITOR Level Control (R20) may be reached by removing the bracket over the Monitor board. The bracket holding transformer T10 must be removed for access to potentiometer R20.

Insert assemblies for MIC LEVEL Input three-pin, professional, female connectors for channels 2 through 7 (J2-J7) may be removed by first removing the transformer or transformers (T1-T8) mounted above the desired connector.

Three-pin, professional, male, audio connector J14 (LINE LEVEL Output) may be removed by first removing the bracket containing the Program Mute board.

The TONE OSC LEVEL Switch/Control (R9), METER SENSITIVITY Control (R17), and POWER ON-OFF Switch (S29) are accessible by removing the knob and retaining nut on the desired control, and removing the two screws securing the Power Supply bracket to the side panel. Carefully swing the bracket to one side, exposing the control.

All push-button switches, with the exception of the FEEDBACK FILTER Switches which are fastened to the Feedback Filters board, may be removed by disconnecting electrical connections, and either unscrewing the screws of the switch module frame or bending the switch module mounting tab into line with its slot and removing the individual switch module.

TRANSISTOR AND DIODE REMOVAL

Most transistors and all diodes used in the Console are mechanically supported by their leads. When replacing these devices, proper lead configurations must be followed. Minimum soldering heat (preferably with a low-wattage soldering iron) should be used to avoid damage to the device. Be sure to place heat-shrinkable tubing or "spaghetti" on leads where the original device contained such tubing. Transistor lead codes are included in the *Notes to Circuit Diagram* (Figure 30, Page 41). IMPORTANT: Be sure to replace ferrite bead rings on those transistor leads where they were removed.

TRANSISTOR AND DIODE CHECKING

Defective transistors and diodes may be located by use of a standard ohmmeter such as a Simpson 260. Polarity of the ohmmeter must be verified before these checks are made.

With a known diode orientation, measure the diode resistance in the forward and reverse directions. The lowest meter reading will establish the probe at the cathode end (schematic symbol arrow points to cathode) as the "minus" probe while the other probe will be "plus." Some ohmmeters are not polarized in this manner with relation to "volts plus probe" and "volts minus probe." With the ohmmeter "plus" probe on the anode end of a diode, and the "minus" probe on the cathode end, the ohmmeter should read approximately 2000 ohms or less. With the meter probes reversed, a reading of about 10,000 ohms or more should be obtained. If either of these conditions is not met, the diode should be replaced.

To check transistors, the ohmmeter should be set to the 100- or 1,000-ohm scale. Transistors and diodes must be removed from the circuit before testing. If all conditions in the following table are met, the transistor may be considered free of any major defect; if any of the following conditions are not met, the transistor should be replaced. See *Notes to Circuit Diagram,* Figure 30, Page 41, for transistor terminal codes.

OHMMETER CONNECTIONS		OHMMETER READING	
"Plus" Lead	*"Minus" Lead*	*NPN Transistor*	*PNP Transistor*
Collector	Emitter	High	High
Emitter	Collector	High	High
Collector	Base	High	Low
Emitter	Base	*	Low
Base	Collector	Low	High
Base	Emitter	Low	*

*Not a significant measurement.

SERVICE ILLUSTRATIONS

Immediately following the parts list on the pages that follow are parts location drawings (Figures 19 to 29, Pages 33-39), and an overall Circuit Diagram (Figure 31, Pages 44-45). Once a board has been located through the parts location photo (Figure 17, Page 19), the components on that board may be located from the corresponding parts location drawing. Foil circuit paths are shown as shaded areas on the drawings. The overall Circuit Diagram (Figure 31, Pages 44-45) shows all board circuits and chassis-mounted parts.

OPTIONAL ACCESSORIES

The following optional accessories are specially designed for use with the Shure SR101 Series 2 Audio Console:

A101A Carrying Case
A101B Panel Lamp Accessory
SR110 Professional Monitor Mixer

GUARANTEE

This Shure product is guaranteed in normal use to be free from electrical and mechanical defects for a period of one year from date of purchase. Please retain proof of purchase date. This guarantee includes all parts and labor. This guarantee is in lieu of any and all other guarantees or warranties, express or implied, and there shall be no recovery for any consequential or incidental damages.

SHIPPING INSTRUCTIONS

Carefully repack the unit and return it prepaid to:

Shure Brothers Incorporated
Attention: Service Department
1501 West Shure Drive
Arlington Heights, Illinois 60004

If outside the United States, return the unit to your dealer or Authorized Shure Service Center for repair. The unit will be returned to you prepaid.

SR101 Series 2 Audio Console

REPLACEMENT PARTS LIST

NOTE: The commercial alternates shown in the following list are not necessarily equivalent parts, but are electrically and mechanically similar, and may be used if direct factory replacements are not immediately available. To maintain highest possible performance and reliability, Shure Factory Replacement Parts should be used.

Reference Designation	Replacement Kit No.*	Replacement Kit Consists Of:			Commercial Alternate
		Qty.	Part No.	Description	
CHASSIS-MOUNTED PARTS AND ASSEMBLIES					
Bd. 1	–	–	90A2250	Printed Circuit Assembly, Preamplifier	None
Bd. 2A	–	–	90A2247	Printed Circuit Assembly, Channel Equalizer, with HI and LO controls	None
Bd. 2B	–	–	90A2249	Printed Circuit Assembly, Reverb Equalizer, with HI and LO controls	None
Bd. 3	–	–	90A2464	Printed Circuit Assembly, Program Mix Amplifier, with REVERB INTENSITY controls	None
Bd. 4	–	–	90A2463	Printed Circuit Assembly, Reverb Mix Amplifier, with REVERB INTENSITY controls	None
Bd. 5	–	–	90A2465	Printed Circuit Assembly, Program Output	None
Bd. 6	–	–	90A1818	Printed Circuit Assembly, Feedback Filters, with switches	None
Bd. 7	–	–	90A1827	Printed Circuit Assembly, Reverb Spring Amplifier	None
Bd. 8	–	–	90A2462	Printed Circuit Assembly, Monitor	None
Bd. 9	–	–	90A2210	Printed Circuit Assembly, Power Supply	None
Bd. 0	–	–	90A2254	Printed Circuit Assembly, Program Mute	None
A1-A9	–	–	90A2423	Volume Control Assembly, with Potentiometers (Individual Channel and MASTER)	None
A10	–	–	90A2910	Reverberation Assembly	None
C17	–	–	50KB104	Capacitor, Film, .1μF, 100V	Sprague 225P10491; CDE DMF-1P1-10
C18	–	–	86A641	Capacitor, Dual Electrolytic, 1000 μF, 70V	None

*Parts listed as RKC Kits should be ordered by that kit number. Any orders received for piece parts where RKC Kit number is shown will be shipped in RKC quantities.

REPLACEMENT PARTS LIST FOR SR101 SERIES 2 AUDIO CONSOLE

Reference Designation	Replacement Kit No.*	Replacement Kit Consists Of:			Commercial Alternate
		Qty.	Part No.	Description	
F1	—	—	80B159	Fuse, Ac, 3AG-3/16A, 125V, Slo-Blo (SR101)	Littelfuse 313000; Bussman MDX3
F1	—	—	80C258	0.1AT for 220V operation,	5x20mm
	—	—	80D258	0.2AT for 115V operation, Fuse, Ac, 250V (SR101-2E)	
F2	—	—	80A267	Fuse, Ac, Pigtail, 3/10A	Littelfuse 315.300
F3	—	—	80A268	Fuse, Dc, Pigtail, 1A, 125V, Slo-Blo	Littelfuse 315001; Bussman MVD
J1-J8	—	—	95B246	Connector, Female, 3-pin Audio, MICROPHONE LEVEL Input	Switchcraft D3F
J9-J11	RKC87	1	95C446	Connector, Phone Jack, 2-Conductor, Single Closed Circuit, AUX LEVEL and LINK IN Input	Switchcraft 12A
J12	RKC68	1	95B446	Connector, Phone Jack, 2-Conductor, Open Circuit, LINK OUT	Switchcraft 11
J13-J14	—	—	95B247	Connector, Male, 3-Pin Audio, MIC LEVEL and LINE LEVEL Output	Switchcraft D3M
J15-J16, J18	—	—	95D446	Connector, Phone Jack, 3-Conductor, Open Circuit, LINE LEVEL and PHONES Output	Switchcraft 12B
J17	—	—	95B658	Connector, Phone Jack, 2-Conductor, Open Circuit, MON LINE LEVEL Output	Switchcraft 111
J19	—	—	95A809	Connector, Female, SWITCHED A.C., 500 WATTS MAX. (SR101 only)	None
J20	—	—	95B590	Connector, Female, Panel LAMP Accessory	None
J21	—	—	95A655	Connector, Female, 11-Pin, ACCESSORY AUX LEVEL	Amphenol 126-805
J22	—	—	95A689	Connector, 3-Pin, AC (MAINS) POWER (SR101-2E)	None
L1-L5	—	—	80A250	Ferrite Bead Ring	Stackpole 57-0181; Ferronics 21-031J
M1	—	—	95A615	Meter Assembly, VU	API Instruments 361, A-Scale
MP1	—	—	90F2085	Knob Assembly, Grey, MONITOR	None
MP2	—	—	90A2085	Knob Assembly, Green, INPUT ATTEN (Channels 1-6)	None
MP3	—	—	90A1850	Knob Assembly, Green, INPUT ATTEN (Channels 7-8 only)	None
MP4	—	—	65A946A	Switch Actuator, AUX/MIC (Channels 7-8 only)	None
MP5	—	—	90D2085	Knob Assembly, Orange, HI FREQ EQ	None
MP6	—	—	90C2085	Knob Assembly, Red, LO FREQ EQ	None

*Parts listed as RKC Kits should be ordered by that kit number. Any orders received for piece parts where RKC Kit number is shown will be shipped in RKC quantities.

REPLACEMENT PARTS LIST FOR SR101 SERIES 2 AUDIO CONSOLE

Reference Designation	Replacement Kit No.*	Replacement Kit Consists Of:			Commercial Alternate
		Qty.	Part No.	Description	
MP7	—	—	90B2085	Knob Assembly, Blue, REVERB INTENSITY	None
MP8	—	—	90E2085	Knob Assembly, Black, TONE OSC LEVEL and METER SENSITIVITY	None
MP9	—	—	90A1812	Knob Assembly, Individual Channel and MASTER Volume	None
MP10	—	—	39A424	Nameplate, Write-on	None
MP11	—	—	39A345	Nameplate, SHURE	None
MP12	—	—	34A518	Dust Cover, Mylar, Black, Volume Control	None
PL1-PL2	RKC7	4	95A466	Lamp, Indicator, 6.3V	GE 47
Q1	RKC55	1	86A338	Transistor, Silicon, NPN	RCA 2N3441
R1A-R8A, R16A**	—	—	46B044	Potentiometer, Linear, 50k, Volume	None
R1B-R8B, R16B**	—	—	46B043	Potentiometer, Modified Log, 50k, Volume	None
R9	—	—	46A038	Potentiometer, 50k, with On-Off Switch, TONE OSC LEVEL	None
R17	—	—	46A037	Potentiometer, 50k, METER SENSITIVITY	None
R20	—	—	46A036	Potentiometer, 50k, MONITOR	None
S1-S6	—	—	55A94	Switch, Rotary, INPUT ATTEN (Channels 1-6)	None
S7-S8	—	—	55A95	Switch, Rotary, Dual, INPUT ATTEN (Channels 7-8 only)	None
S9-S16	—	—	55A85B	Switch Assembly, Beige, (8 modules plus frame), Push-button, DPDT, PROGRAM	None
S17-S24	—	—	55A85A	Switch Assembly, Grey, (8 modules plus frame), Push-button, DPDT, MONITOR	None
S25-S26	—	—	55A119	Switch, Slide, DPDT, PRE LINK/POST LINK and PHASE	None
S27	—	—	55A84B	Switch, Push-button, Blue, DPDT, REVERB	None
S28	—	—	55A84A	Switch, Push-button, Grey, DPDT, PROGRAM MONITOR	None
S29	—	—	55A96	Switch, Toggle, SPST, POWER ON-OFF (SR101)	Cutler-Hammer 7501K13
S29	—	—	55A117	Switch, Toggle, SPST, POWER ON-OFF (SR101-2E)	None
S30	—	—	55A116	Switch, Slide, DPDT, VOLTAGE SELECTOR (SR101-2E)	None

*Parts listed as RKC Kits should be ordered by that kit number. Any orders received for piece parts where RKC Kit number is shown will be shipped in RKC quantities.
**See also Assemblies A1-A9.

REPLACEMENT PARTS LIST FOR SR101 SERIES 2 AUDIO CONSOLE

Reference Designation	Replacement Kit No.*	Replacement Kit Consists Of:			Commercial Alternate
		Qty.	Part No.	Description	
T1-T8	—	—	90A1876	Transformer and Shield Assembly, Mic Input	None
T9	—	—	51A235	Transformer, Line Level Output	None
T10	—	—	51A228	Transformer, Headphone Monitor Output	None
T11	—	—	51A262	Transformer, Ac Power (SR101)	None
T11	—	—	51A265	Transformer, Ac Power (SR101-2E)	None
W1	—	—	90A1862	Cable and Plug Assembly, Reverb Output	None
W2	—	—	90B1862	Cable and Plug Assembly, Reverb Input	None
W3	—	—	95A632	Line Cord, Ac, Grounded, 9-Foot (7/64" Diameter) (SR101)	Belden 17408
W3	—	—	90A1888	Line Cord, Ac, Grounded, 9-Foot, Single Connector (SR101-2E)	None
XF1	—	—	95A429	Fuseholder, Miniature, Panel-Mounting (SR101)	Littelfuse 342014
XF1	—	—	95A604	Fuseholder, Miniature, Panel-Mounting (SR101-2E)	None
XPL1	—	—	95A588	Lampholder and Bracket Assembly, Solder Terminal	None
XPL2	—	—	95A587	Lampholder and Bracket Assembly, Wire Terminal	None
———	—	—	27A974	SR101 Audio Console Mounting Template	None
PREAMPLIFIER (BOARD 1)					
C110, C120, C130, C140, C150, C160, C170, C180, C190, C191	—	—	50KB104	Capacitor, Film, 0.1 μF, 100V	Sprague 225P10491; CDE DMF-1P1-10
C111, C121, C131, C141, C151, C161, C171, C181	—	—	86B629	Capacitor, Electrolytic, 22 μF, 35V	Sprague 502D-226G050CE10; Mallory MTV-25CB35
C113, C123, C133, C143, C153, C163, C173, C183	—	—	86A630	Capacitor, Electrolytic, 4.7 or 5 μF, 35V	Sprague 300-TE1303; CDE NLW-5-50
C192, C193	—	—	86J628	Capacitor, Electrolytic, 50 μF, 35V	Sprague 30D-TE1307; CDE NLW-50-50
C194	—	—	86L628	Capacitor, Electrolytic, 250 μF, 40V	None
D100	RKC50	2	86A410	Silicon Rectifier, 100V, ½A	Motorola 1N4002

*Parts listed as RKC Kits should be ordered by that kit number. Any orders received for piece parts where RKC Kit number is shown will be shipped in RKC quantities.

REPLACEMENT PARTS LIST FOR SR101 SERIES 2 AUDIO CONSOLE

Reference Designation	Replacement Kit No.*	Replacement Kit Consists Of:			Commercial Alternate
		Qty.	Part No.	Description	
L110, L120, L130, L140, L150, L160, L170, L180	—	—	80A253	Ferrite Bead Ring	Stackpole 57-0180; Ferronics 21-030J
Q110, Q120, Q130, Q140, Q150, Q160, Q170, Q180	RKC89	4	86A350	Transistor, Silicon, Low Power, NPN	Motorola 2N5210
Q111, Q121, Q131, Q141, Q151, Q161, Q171, Q181	—	—	86A348	Transistor, Silicon, Low Power, PNP	Motorola or Fairchild 2N5087
Q112, Q122, Q132, Q142, Q152, Q162, Q172, Q182	RKC9	4	86A349	Transistor, Silicon, NPN	Motorola 2N5088; TI 2N3711
EQUALIZER (BOARDS 2A and 2B)					
C200, C201, C205, C208	—	—	86A630	Capacitor, Electrolytic, 4.7 or 5 μF, 35V	Sprague 30D-TE1303; CDE NLW-5-50
Q200, Q201***, Q202	RKC9	4	86A349	Transistor, Silicon, NPN	Motorola 2N5088; TI 2N3711
R204, R208	—	—	46A034	Potentiometer, 50k, HI and LO FREQ EQ	None
PROGRAM MIX AMPLIFIER (BOARD 3)					
C300-C302	—	—	86A630	Capacitor Electrolytic, 4.7 or 5 μF, 35V	Sprague 30D-TE1303; CDE NLW-5-50
C303	—	—	86A629	Capacitor Electrolytic, 22 μF, 35V	Sprague 502D-476G016CC1C; Mallory MTV-35CB25
D300, D301	—	—	86A415	Diode, Silicon, Computer, 75V	TI or GE 1N4148
D302	RKC50	2	86A410	Silicon Rectifier, 100V, ½A	Motorola 1N4002
L300	—	—	80A250	Ferrite Bead Ring	Stackpole 57-0181; Ferronics 21-031J
Q300	RKC89	4	86A350	Transistor, Silicon, NPN	Motorola 2N5210
Q301	—	—	86A348	Transistor, Silicon, PNP	Motorola or Fairchild 2N5087
Q302	RKC65	1	86A334	Transistor, Silicon, NPN	TI TIS92
Q303	RKC66	1	86A335	Transistor, Silicon, PNP	TI TIS93
R300-R303	—	—	46A035	Potentiometer, Dual, 50k/50k, REVERB INTENSITY	None

*Parts listed as RKC Kits should be ordered by that kit number. Any orders received for piece parts where RKC Kit number is shown will be shipped in RKC quantities.
***Not included on Bd. 2B.

REPLACEMENT PARTS LIST FOR SR101 SERIES 2 AUDIO CONSOLE

Reference Designation	Replacement Kit No.*	Replacement Kit Consists Of:			Commercial Alternate
		Qty.	Part No.	Description	
REVERB MIX AMPLIFIER (BOARD 4)					
C400-C402	—	—	86A630	Capacitor, Electrolytic, 4.7 or 5 μF, 35V	Sprague 30D-TE1303; CDE NLW-5-50
C403	—	—	86B629	Capacitor Electrolytic, 22 μF, 35V	Sprague 502D-226G050CE1C; Mallory MTV-25CB35
C404	—	—	86L628	Capacitor Electrolytic, 250 μF, 40V	CDE BR250-50
D400, D401	—	—	86A415	Diode, Silicon, Computer, 75V	TI or GE 1N4148
L400	—	—	80A250	Ferrite Bead Ring	Stackpole 57-0181; Ferronics 21-0351J
Q400	RKC89	4	86A350	Transistor, Silicon, NPN	Motorola 2N5210
Q401	—	—	86A348	Transistor, Silicon, PNP	Motorola or Fairchild 2N5087
Q402	RKC65	1	86A334	Transistor, Silicon, NPN	TI TIS92
Q403	RKC66	1	86A335	Transistor, Silicon, PNP	TI TIS93
R400-R403	—	—	46A035	Potentiometer, Dual, 50k/50k, REVERB INTENSITY	None
PROGRAM OUTPUT (BOARD 5)					
C500	—	—	86L628	Capacitor, Electrolytic, 250 μF, 40V	CDE BR250-50
C505	—	—	86F630	Capacitor, Electrolytic, 1 μF, 25V	Sprague 30D-TE1200; CDE NLW-1-25
C507	—	—	50KB104	Capacitor, Film, .1 μF, 100V	Sprague 225P10491; CDE DMF-1P1-10
C510, C511, C516, C517, C519	—	—	86A630	Capacitor, Electrolytic, 4.7 or 5 μF, 35V	Sprague 30D-TE1303; CDE NLW-5-50
C514	—	—	86B629	Capacitor, Electrolytic, 22 μF, 35V	Sprague 502D-226G050CE1C; Mallory MTV-25B35
C515	—	—	86N628	Capacitor, Electrolytic, 100 μF, 25V	Sprague 30D-TE1211; Mallory MTA-100F35; CDE NLW-100-25
C518	—	—	86A629	Capacitor, Electrolytic, 47 μF, 12V	Sprague 502D-476G016CC1C; Mallory MTV-35CB25

*Parts listed as RKC Kits should be ordered by that kit number. Any orders received for piece parts where RKC Kit number is shown will be shipped in RKC quantities.

REPLACEMENT PARTS LIST FOR SR101 SERIES 2 AUDIO CONSOLE

Reference Designation	Replacement Kit No.*	Replacement Kit Consists Of:			Commercial Alternate
		Qty.	Part No.	Description	
D500	RKC50	2	86A410	Silicon Rectifier, 100V, ½A	Motorola 1N4002
D501-D503	—	—	86A415	Diode, Silicon, Computer, 75V	TI or GE 1N4148
Q500, Q505	RKC89	4	86A350	Transistor, Silicon, NPN	Motorola 2N5210
Q501, Q506	—	—	86A348	Transistor, Silicon, PNP	Motorola or Fairchild 2N5087
Q502	—	—	86A329	Transistor, Silicon, N-Channel, Field Effect	Motorola 2N5458
Q503, Q504, Q509	RKC9	4	86A349	Transistor, Silicon, NPN	Motorola 2N5088; TI 2N3711
Q507	RKC65	1	86A334	Transistor, Silicon, NPN	TI TIS92
Q508	RKC66	1	86A335	Transistor, Silicon, PNP	TI TIS93
R529	—	—	46F033	Potentiometer, 10k, VU Cal.	None
FEEDBACK FILTERS (BOARD 6)					
C612	—	—	86B629	Capacitor, Electrolytic, 22 μF, 35V	Sprague 502D-226G050CE1C; Mallory MTV-25CB35
Q600-Q603	RKC9	4	86A349	Transistor, Silicon, NPN	Motorola 2N5088; TI 2N3711
S600-S603	—	—	55A91A	Switch Assembly (4 switch modules plus frame), Push-button, DPDT, FEEDBACK FILTERS	None
REVERB SPRING AMPLIFIER (BOARD 7)					
C700	—	—	86L628	Capacitor, Electrolytic, 250 μF, 40V	CDE BR230-5
C701, C706	—	—	86J628	Capacitor, Electrolytic, 50 μF, 35V	Sprague 30D-TE1307; CDE NLW-50-50
C702, C707, C708, C711, C717	—	—	50KB104	Capacitor, Film, .1 μF, 100V	Sprague 225P10491; CDE DMF-1P1-10
C703, C705, C714, C716	—	—	86A630	Capacitor, Electrolytic, 4.7 or 5 μF, 35V	Sprague 30D-TE1303; CDE NLW-5-50
D700	RKC50	2	86A410	Silicon Rectifier, 100V, ½A	Motorola 1N4002
D701-D706	RKC79	1	86A403	Silicon Rectifier, 50V, ½A	Motorola 1N4001

*Parts listed as RKC Kits should be ordered by that kit number. Any orders received for piece parts where RKC Kit number is shown will be shipped in RKC quantities.

REPLACEMENT PARTS LIST FOR SR101 SERIES 2 AUDIO CONSOLE

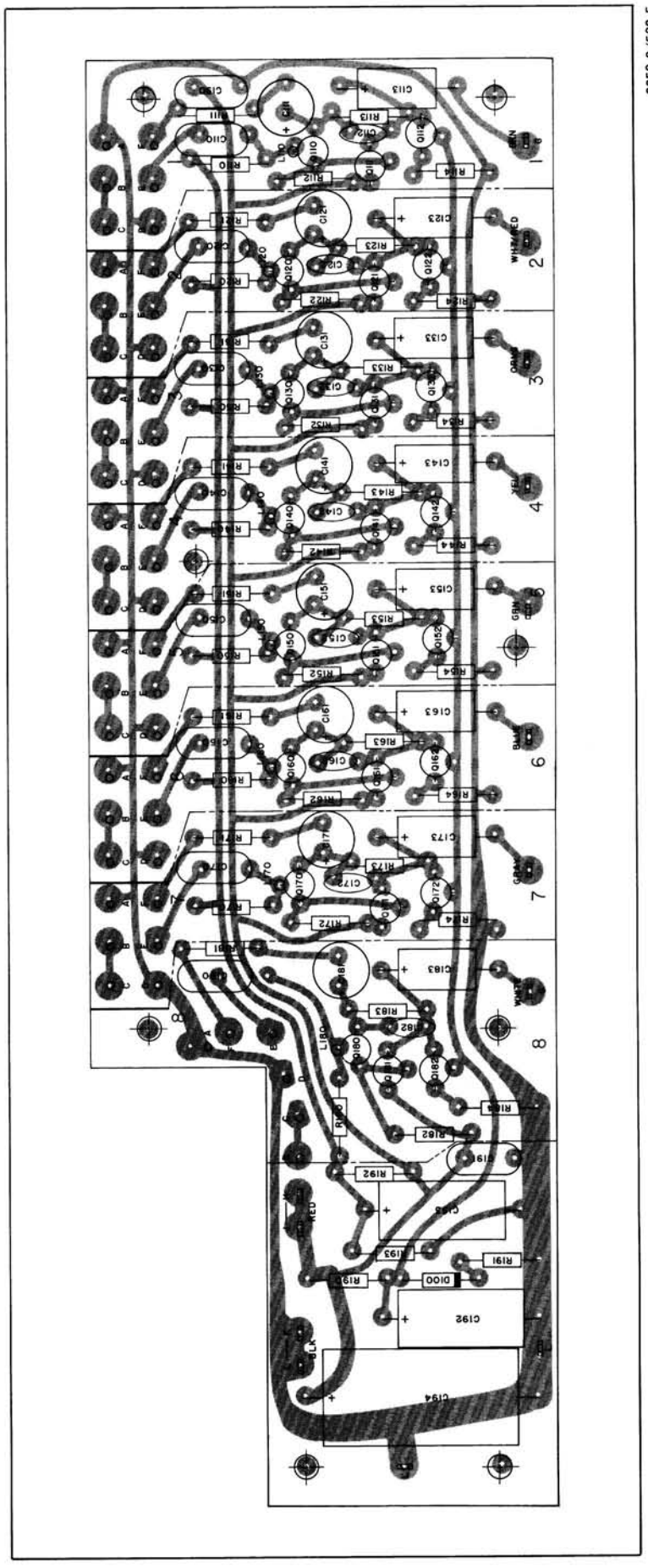
Reference Designation	Replacement Kit No.*	Replacement Kit Consists Of:			Commercial Alternate
		Qty.	Part No.	Description	
Q700	RKC12	1	86A336	Transistor, Silicon, NPN	TI TIS97
Q701	—	—	86A352	Transistor, Silicon, Power, NPN	Motorola MPS-U02; GE D40D4
Q702	—	—	86A353	Transistor, Silicon, Power, PNP	Motorola MPS-U52; GE D41D4
Q703-Q706	RKC9	4	86A349	Transistor, Silicon, NPN	Motorola 2N5088; TI 2N3711
MONITOR (BOARD 8)					
C800, C803, C805, C807, C808	—	—	86A630	Capacitor, Electrolytic, 4.7 or 5 μF, 35V	Sprague 30D-TE1303: CDE NLW-5-50
C802, C804	—	—	86N628	Capacitor, Electrolytic, 100 μF, 25V	Sprague 30D-TE1211; Mallory MTA-100F35; CDE NLW-100-25
D801, D802	RKC21	4	86A404	Silicon Rectifier, 100V, ½A	Motorola 1N4002
D803	—	—	86A415	Diode, Silicon, Computer, 75V	TI or GE 1N4148
Q800	RKC12	1	86A336	Transistor, Silicon, NPN	TI TIS97
Q801	—	—	86A348	Transistor, Silicon, PNP	Motorola or Fairchild 2N5087
Q802	RKC65	1	86A334	Transistor, Silicon, NPN	TI TIS92
Q803	RKC66	1	86A335	Transistor, Silicon, PNP	TI TIS93
Q804	RKC9	4	86A349	Transistor, Silicon, NPN	Motorola 2N5088; TI 2N3711
POWER SUPPLY (BOARD 9)					
C900	—	—	86P628	Capacitor, Electrolytic, 250 μF, 60V	None
C901	—	—	86L628	Capacitor, Electrolytic, 250 μF, 40V	CDE BR250-50
C902	—	—	50KB104	Capacitor, Film, .1 μF, 100V	Sprague 225P10491; CDE DMF-1P1-10
D900-D903	RKC50	2	86A410	Silicon Rectifier, 100V, ½A	Motorola 1N4002
D904	—	—	86A416	Silicon Zener Diode, 32V, 5%	Motorola 1N4752B
Q900	—		86A344	Transistor, Silicon, Power, NPN	RCA 40347
R906	—	—	45CB208C	Resistor, Fixed, 2.0 ohms, 1W, 5%	None

*Parts listed as RKC Kits should be ordered by that kit number. Any orders received for piece parts where RKC Kit number is shown will be shipped in RKC quantities.

REPLACEMENT PARTS LIST FOR SR101 SERIES 2 AUDIO CONSOLE

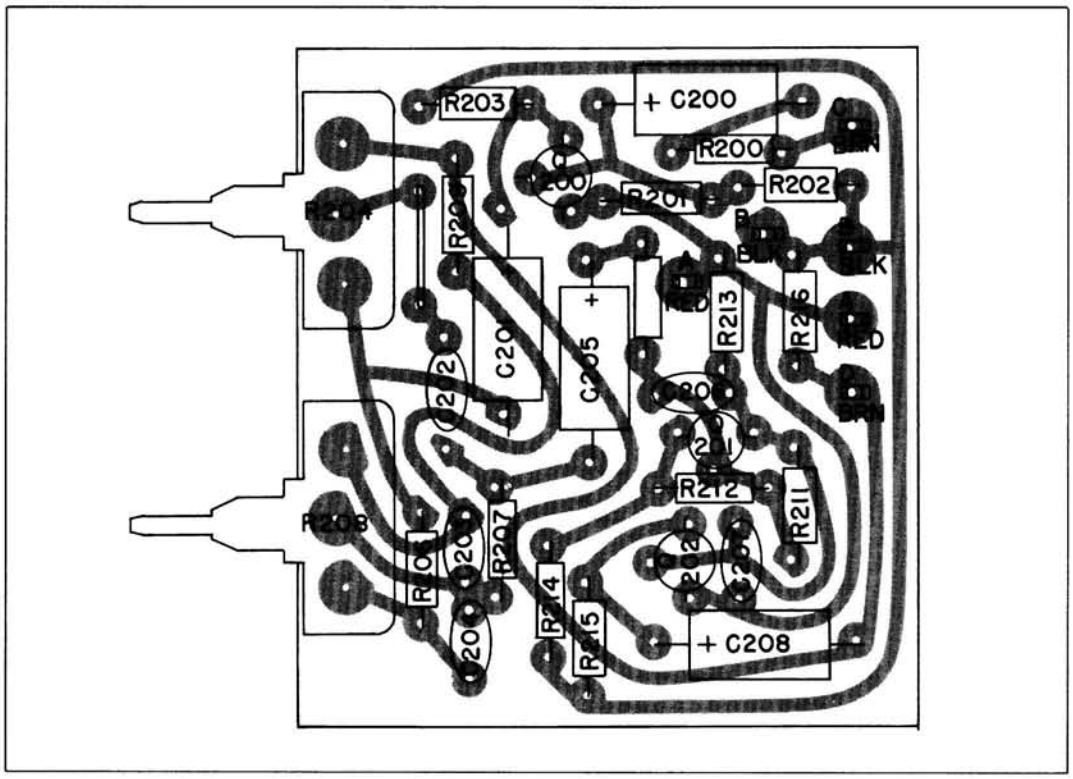
Reference Designation	Replacement Kit No.*	Replacement Kit Consists Of:			Commercial Alternate
		Qty.	Part No.	Description	
PROGRAM MUTE (BOARD 0)					
C90	—	—	50KC104	Capacitor, Film, .1 μF, 100V	Sprague 225P10491; CDE DMF-1P1-10
C91	—	—	86A632	Capacitor, Electrolytic, 1000 μF, 25V	Sprague TVA-1211
D90-D92	RKC21	4	86A404	Silicon Rectifier, 100V, ½A	Motorola 1N4002
Q90	RKC9	4	86A349	Transistor, Silicon, NPN	Motorola 2N5088; TI 2N3711
Q91	RKC12	1	86A336	Transistor, Silicon, NPN	TI TIS97
RLY90	—		55A93	Relay, Reed, SPST, 24 Vdc	None

*Parts listed as RKC Kits should be ordered by that kit number. Any orders received for piece parts where RKC Kit number is shown will be shipped in RKC quantities.



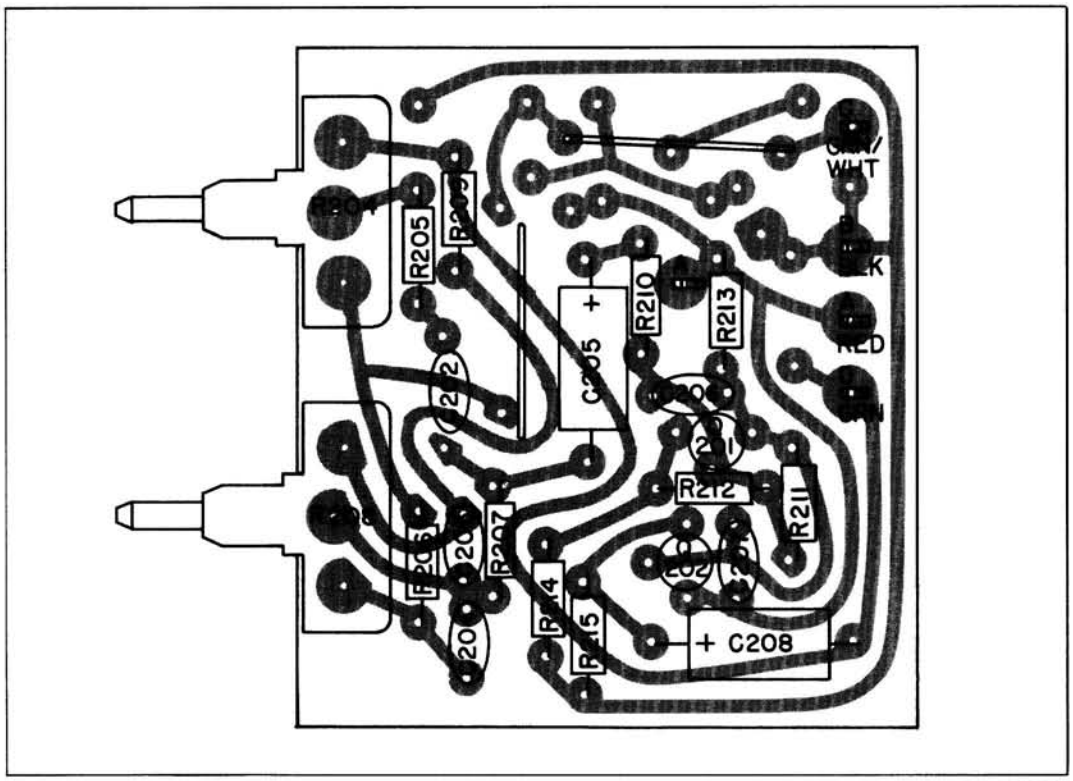
2253-3/589-5

FIGURE 19. BOARD 1: PREAMPLIFIER



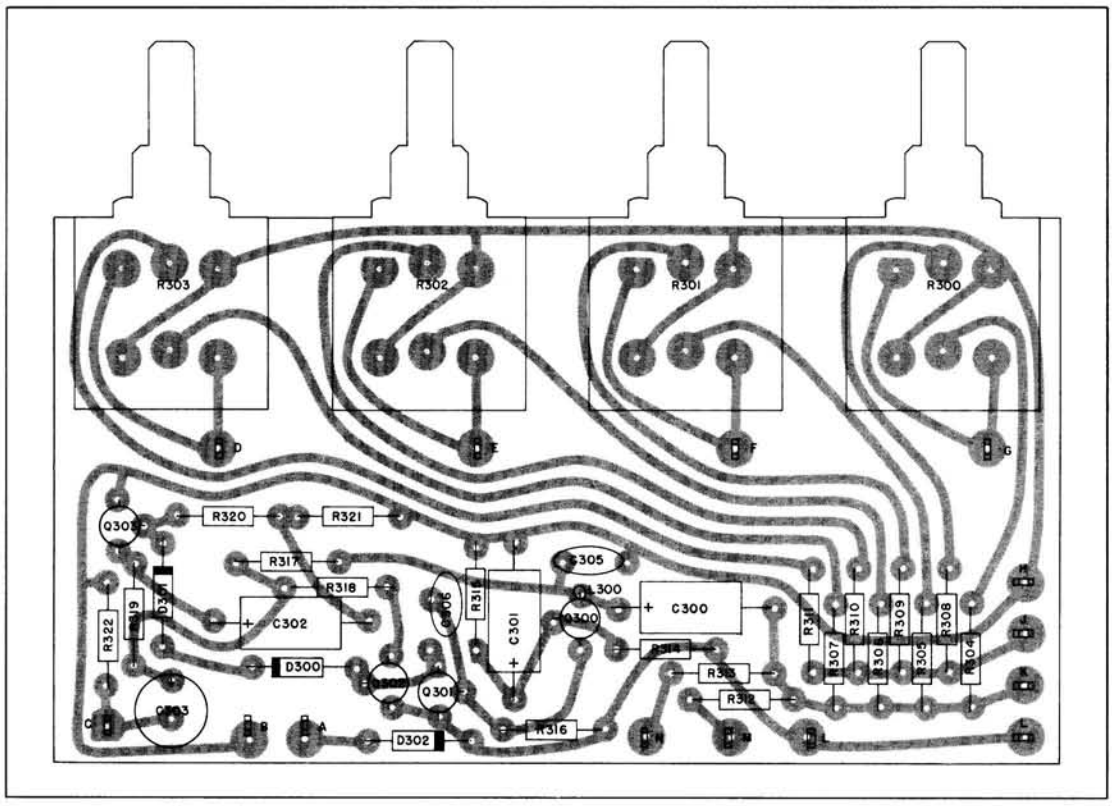
2247-2/2246-3/587-4

FIGURE 20. BOARD 2A: CHANNEL EQUALIZER



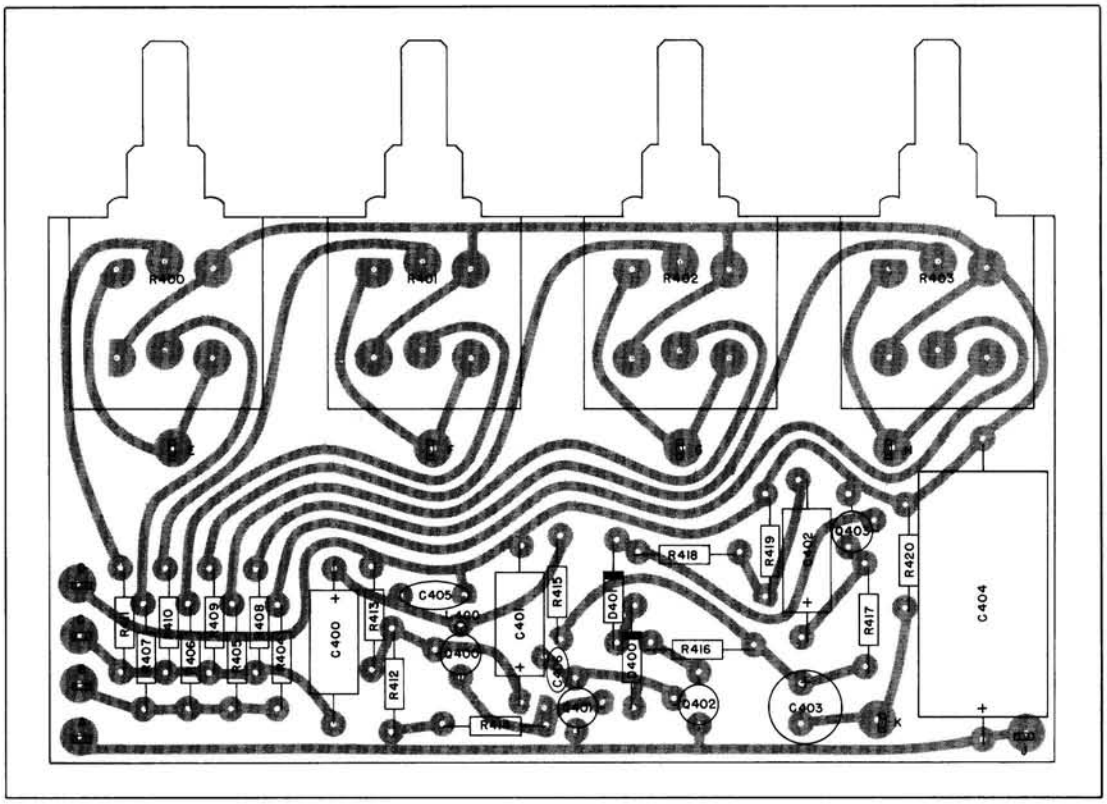
2249-2/2248-3/588-4

FIGURE 21. BOARD 2B: REVERB EQUALIZER



2464-1/2458-1/647-1

FIGURE 22. BOARD 3: PROGRAM MIX AMPLIFIER



2463-1/2460-1/646-1

FIGURE 23. BOARD 4: REVERB MIX AMPLIFIER

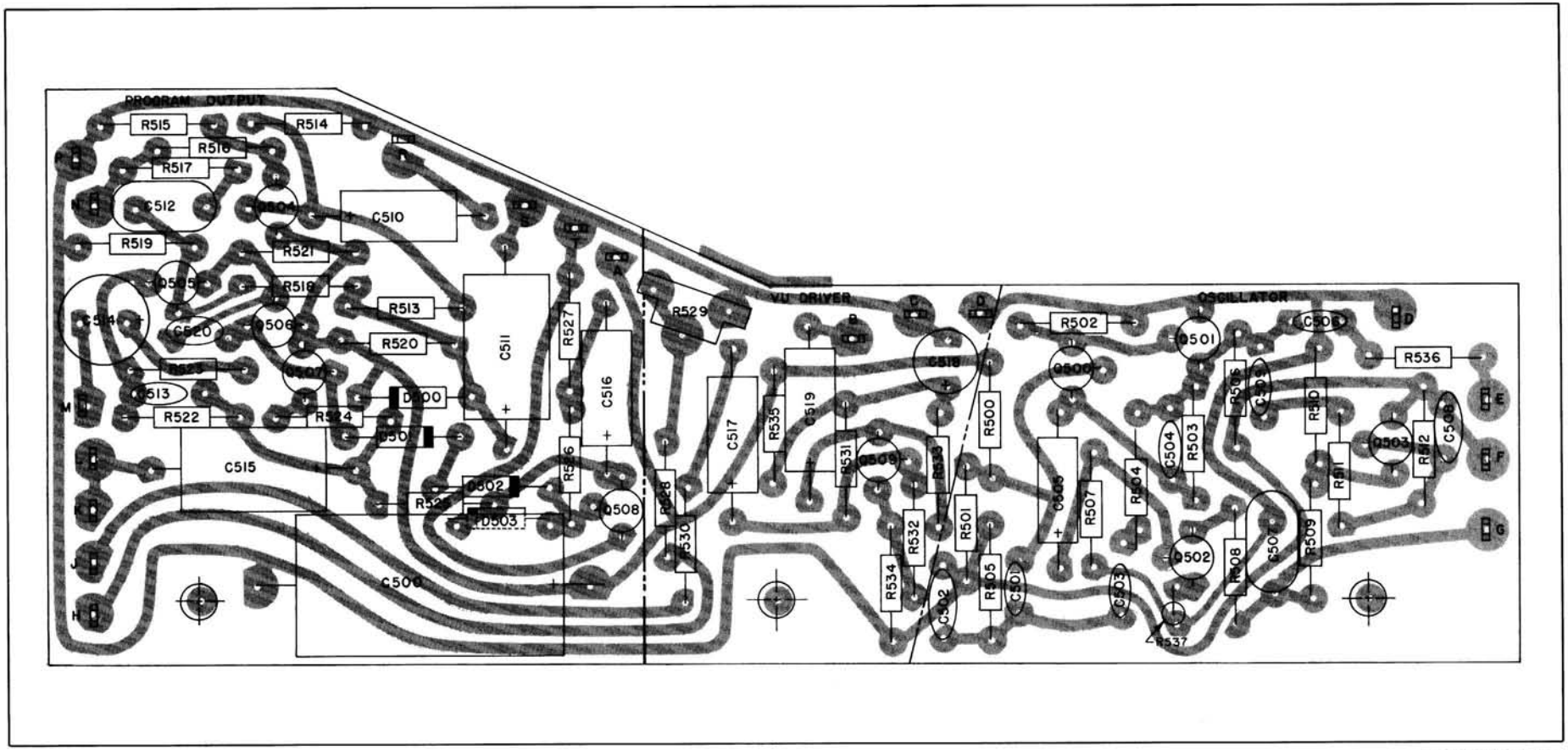
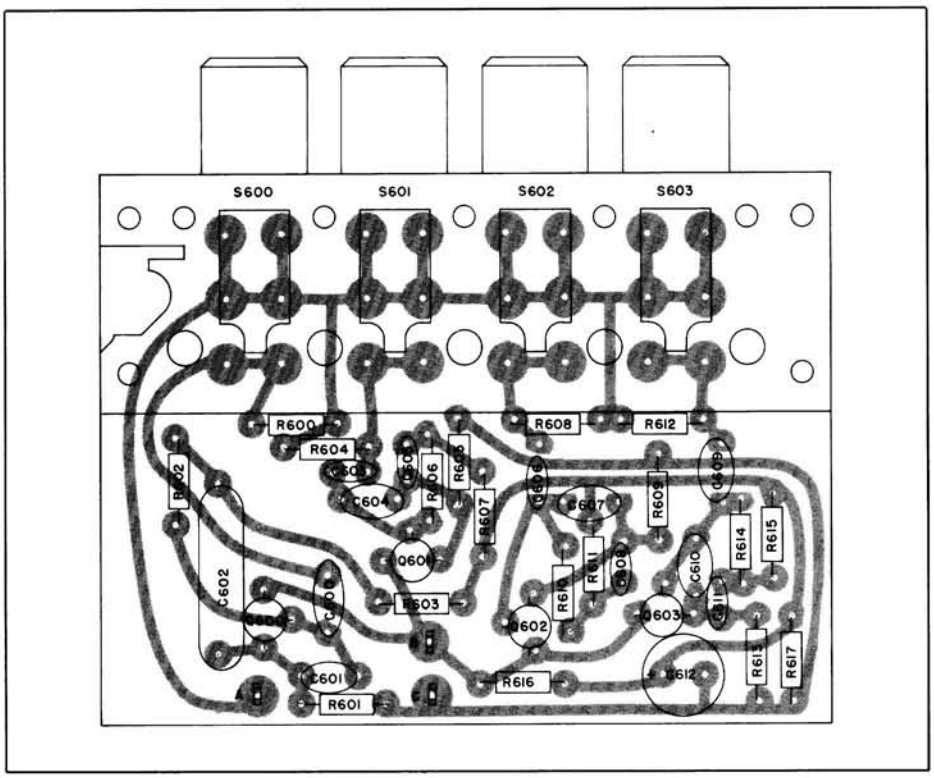


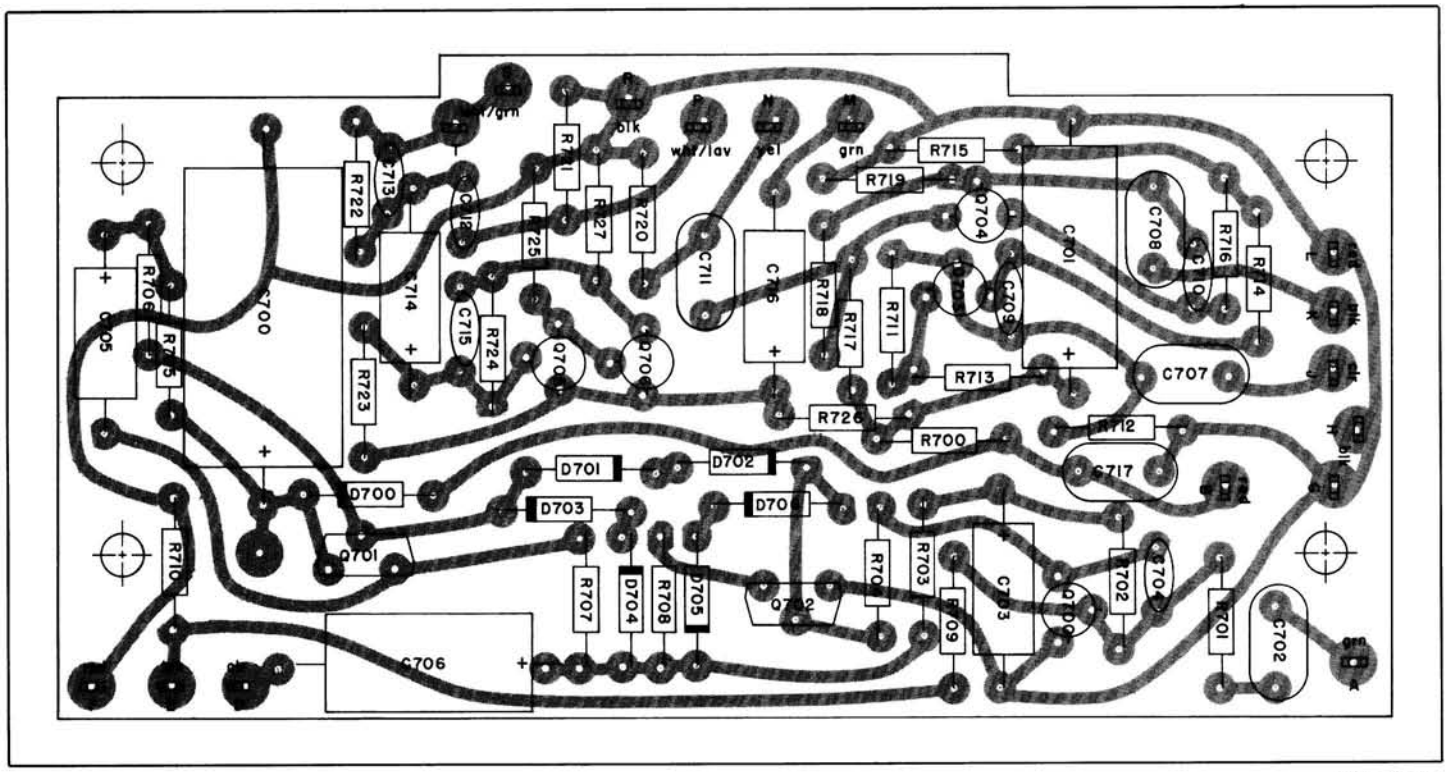
FIGURE 24. BOARD 5: PROGRAM OUTPUT

2465-1/2459-1/645-1
ADDED R537



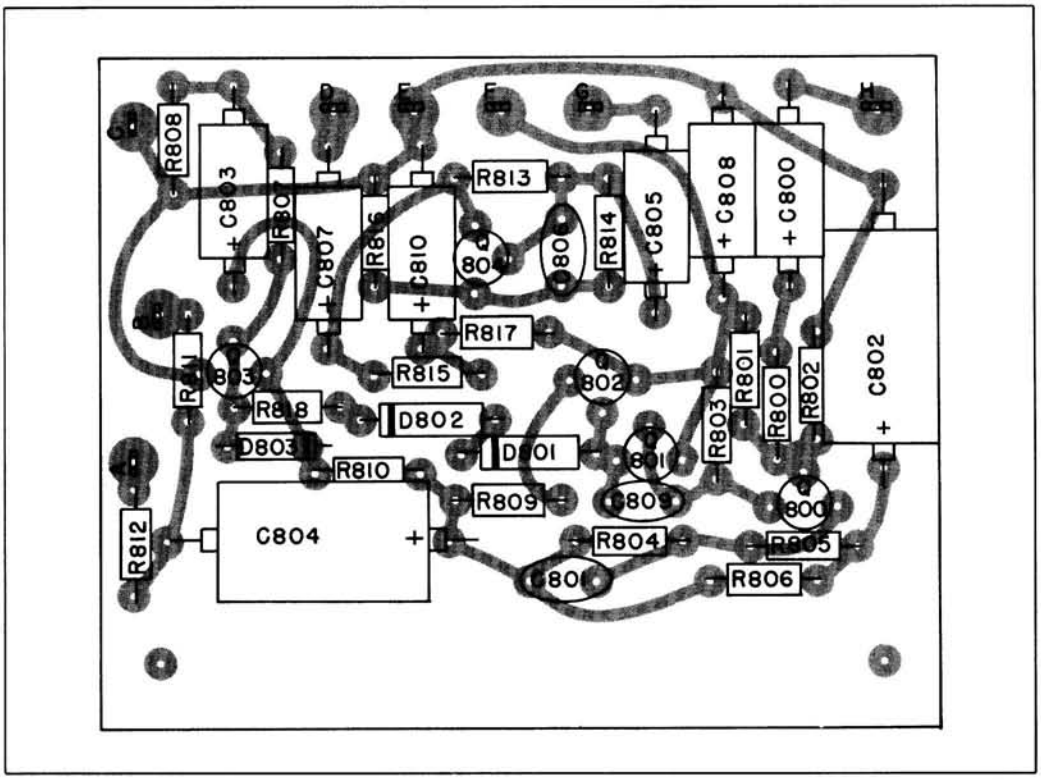
1818-3/1817-1/482-3

FIGURE 25. BOARD 6: FEEDBACK FILTERS



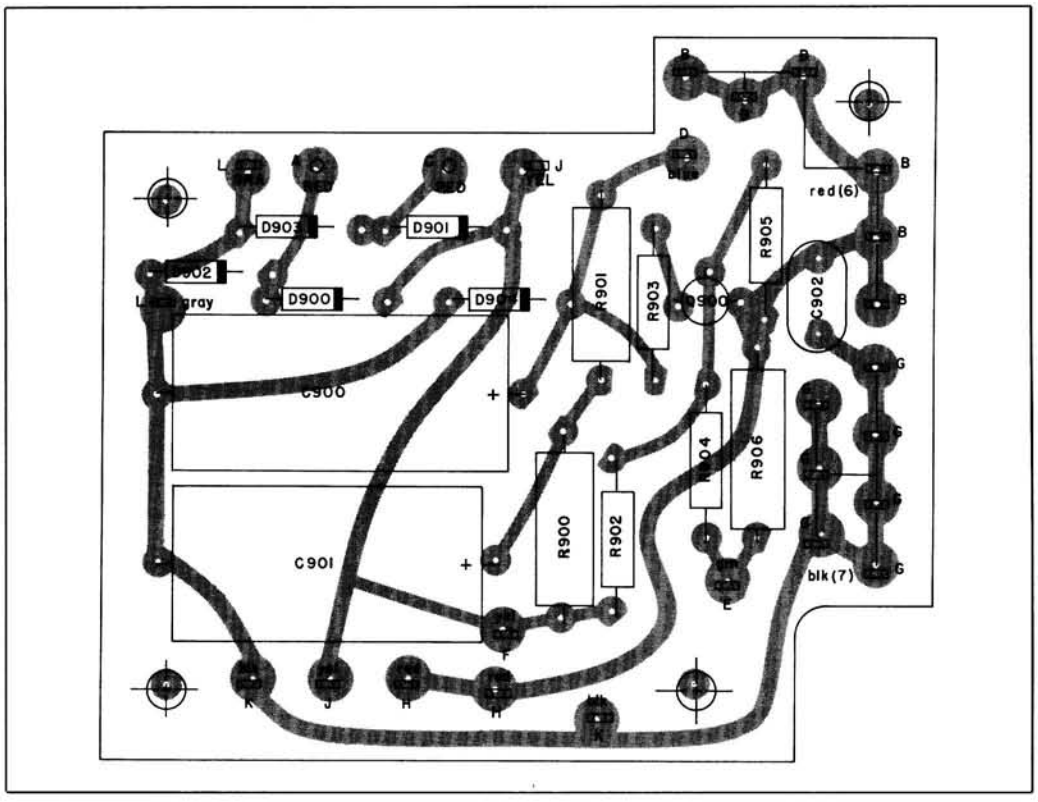
1827-3/488-3

FIGURE 26. BOARD 7: REVERB SPRING AMPLIFIER



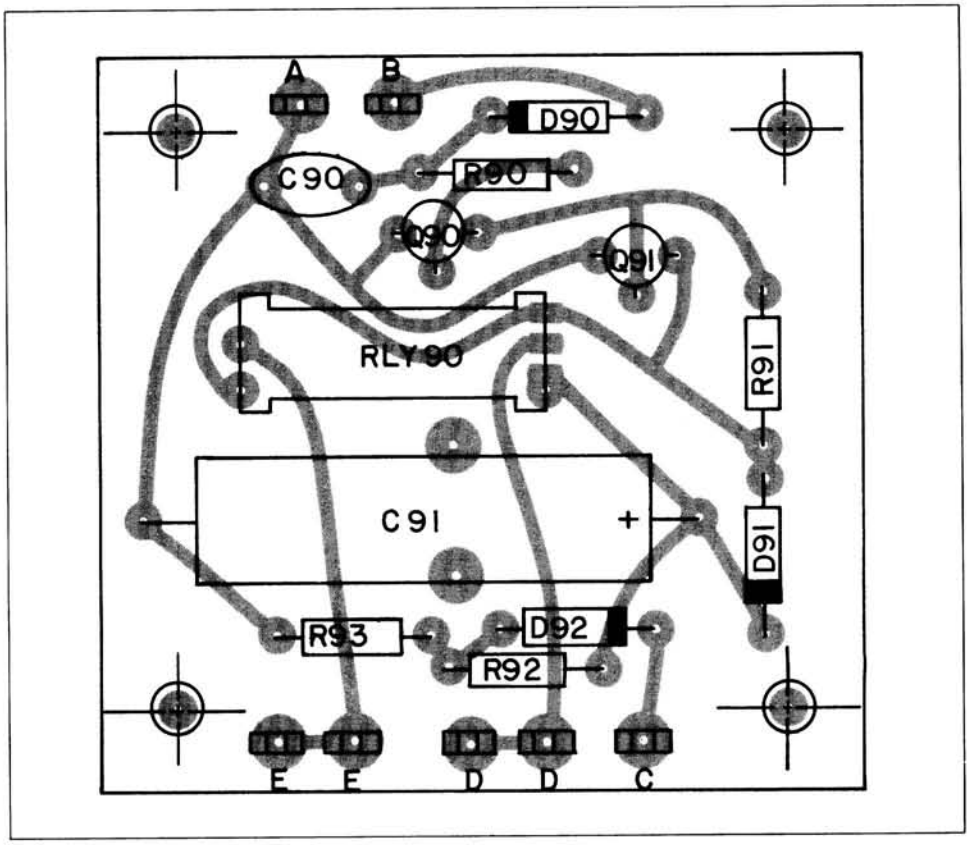
2462-1/2461-1/644-1

FIGURE 27. BOARD 8: MONITOR



2210-9/2251-3/591-4

FIGURE 28. BOARD 9: POWER SUPPLY



2254-3/592-4

FIGURE 29. BOARD 0: PROGRAM MUTE

SR101 Series 2 Audio Console

NOTES TO CIRCUIT DIAGRAM

GENERAL

Shure part numbers are not shown in the Parts List accompanying the Circuit Diagram (Figure 31, Page 44) if parts are readily available through local electronics parts suppliers. In these instances, the Circuit Diagram shows only the reference designation and value of the standard parts.

All capacitor values are shown in microfarads unless otherwise designated. All non-electrolytic capacitors are 100 working volts dc or more unless otherwise specified. Electrolytic capacitors are shown in microfarads x volts.

All resistor values are shown in ohms (k = 1000). Resistors are 10% tolerance unless otherwise specified. Resistors are ¼-watt unless otherwise specified.

Transistor lead codes are as shown in Figure 30. Acceptable replacements are as shown in the Parts List.

The following ground symbols denote:

Chassis Ground
Circuit Ground
Printed Circuit Board Ground

TROUBLESHOOTING

A general troubleshooting process is as follows: If the Console is completely "dead," check the ac power source, fuses, and power supply output (30V between pins B and G, Board 9). If the indicator lamps are on but the output is distorted, low or not present, apply an input signal as described under *Ac Voltage Measurements* below, and determine that the input and output voltage to each board assembly is correct. If an incorrect ac voltage is found at any board output, perform *Dc Voltage Measurements* on that board as described below to isolate the problem area.

AC VOLTAGE MEASUREMENTS

The numbers within rectangular symbols ▭ on the circuit diagram denote the ac voltages at that point under the following test conditions:

1. Voltages measured with respect to chassis unless otherwise indicated.
2. Line voltage: 120V, 60 Hz (SR101)
   120V or 240V, 60 Hz (SR101-2E)
3. Test signal of 1 mV, 1 kHz applied across pins 2 and 3 of connector J1.
4. Ac voltage measurements may vary ±30% from values shown.
5. Measurements made with ac VTVM of 1 megohm or greater input impedance.
6. 600-ohm load across LINE LEVEL Output Connector J14 (pins 2 and 3).
7. FEEDBACK FILTERS Switches released (out).
8. All Equalization Controls in 0 (flat) setting.
9. All Volume Controls set to maximum (14).

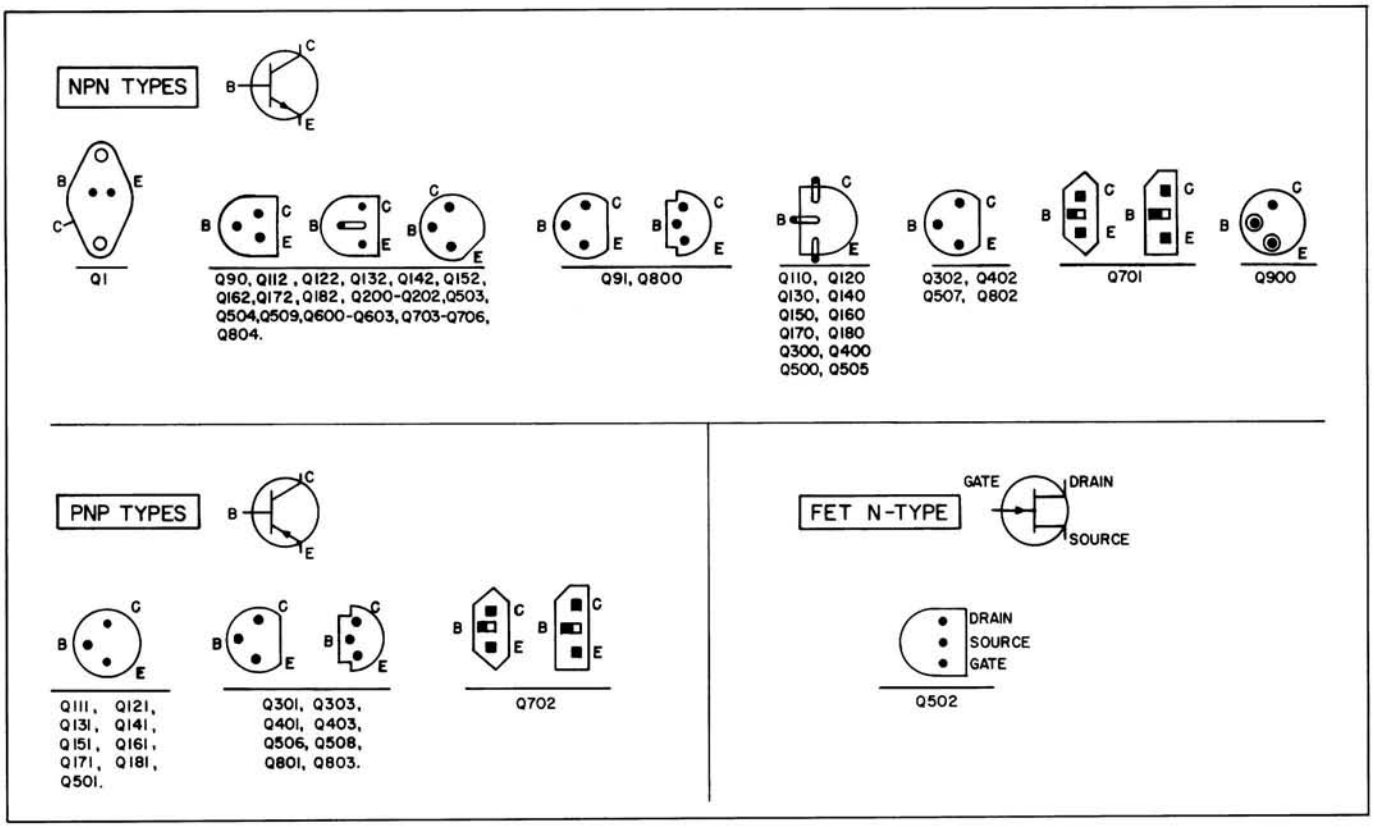


FIGURE 30. TRANSISTOR LEAD CODES

10. Reverb circuit measurements made with REVERB INTENSITY Controls full clockwise, and Master Reverb Switch depressed (on). Note that reverb spring and following stages vary with frequency; measurements given are typical only.
11. Monitor circuit measurements made with all MONITOR Switches depressed (on), and PROGRAM MONITOR Switch released (off).
12. Tone oscillator circuit measurements on Program Output (Bd. 5) made with TONE OSC LEVEL Switch on.

DC VOLTAGE MEASUREMENTS

The numbers within elliptical symbols ⬭ on the circuit diagram denote the dc voltages at that point under the following test conditions:

1. Voltages measured with respect to chassis unless otherwise indicated.
2. Line voltage: 120V, 60 Hz (SR101)
   120V or 240V, 60 Hz (SR101-2E)
3. No input signal applied.
4. Dc voltage measurements may vary ±20% from values shown.
5. Measurements made with VTVM of 11 megohms or greater input impedance.
6. Tone oscillator circuit measurements on Program Output (Bd. 5) made with TONE OSC LEVEL Switch on.

RESISTANCE MEASUREMENTS

With the ac line cord disconnected from the ac source and the POWER ON-OFF Switch in the OFF position, the following ohmmeter measurements may be made:

1. Reverberation Assembly A10 output coil: approximately 180 ohms; input: approximately 10 ohms.
2. Transformers may be checked for continuity of each winding.
3. To test transistors and diodes, see Page 22.

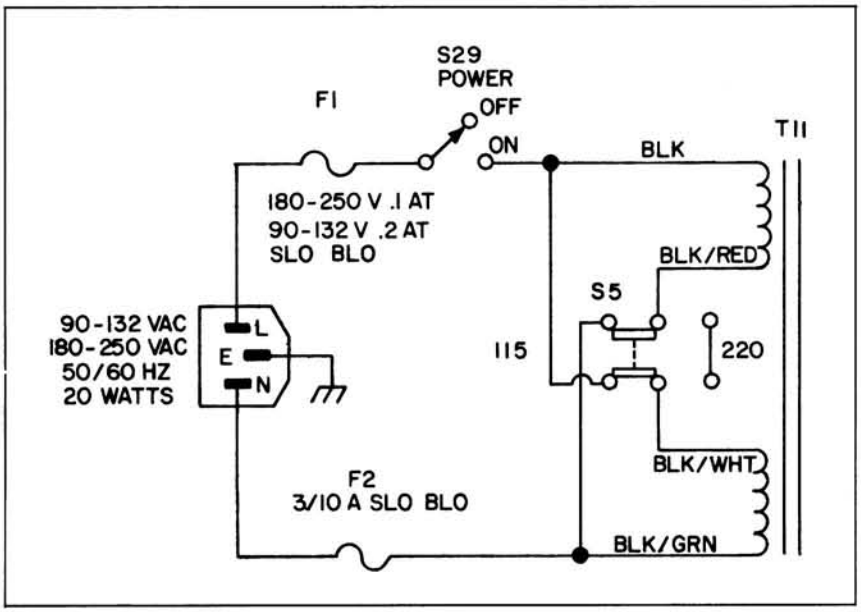
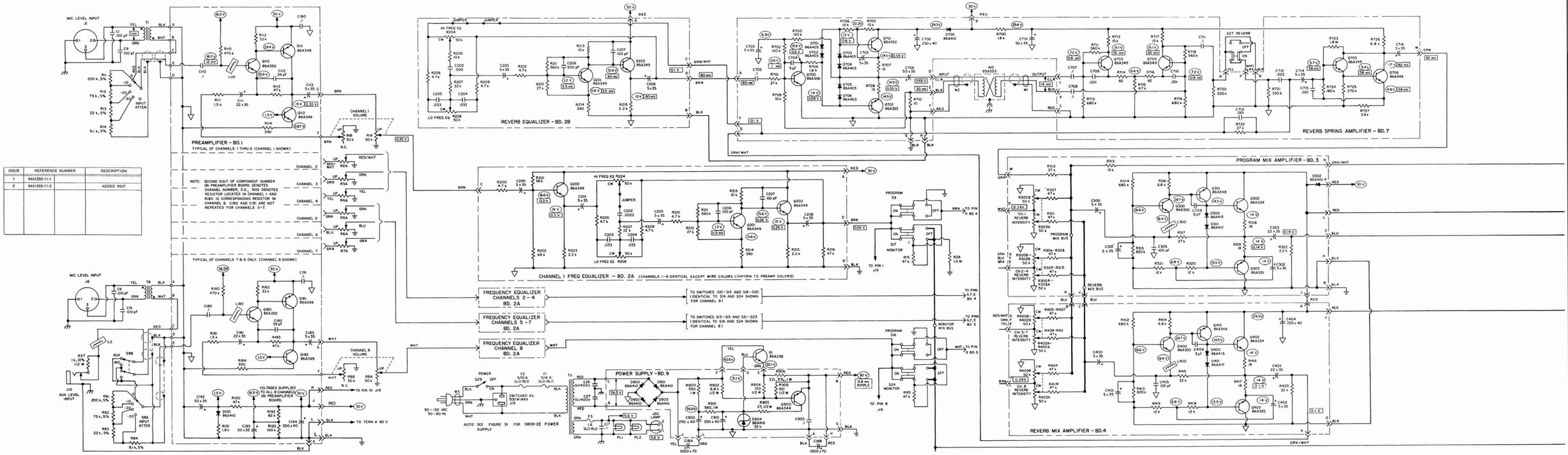
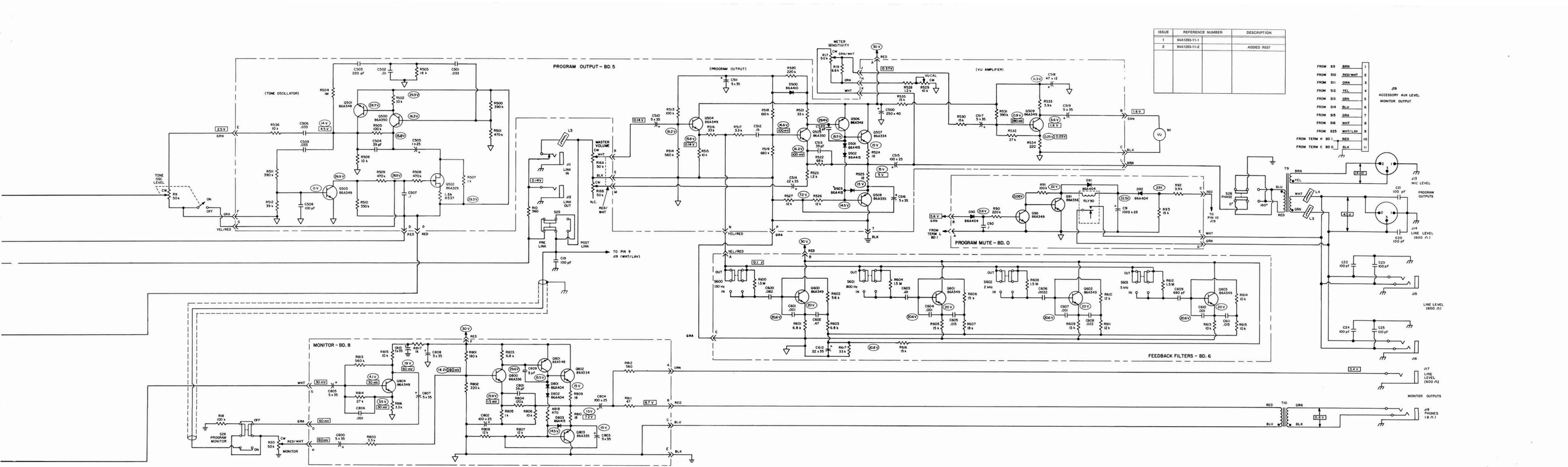


FIGURE 31. SR101-2E POWER SUPPLY B1293-11-1



ISSUE	REFERENCE NUMBER	DESCRIPTION
1	94A1293-11-1	
2	94A1293-11-2	ADDED R537

FIGURE 32. SR101 SERIES 2 AUDIO CONSOLE CIRCUIT DIAGRAM



ISSUE	REFERENCE NUMBER		DESCRIPTION
1	94A1293-11-1		
2	94A1293-11-2		ADDED R537

FIGURE 32. SR101 SERIES 2 AUDIO CONSOLE CIRCUIT DIAGRAM

SR101 Series 2 Audio Console

CONDENSED OPERATING INSTRUCTIONS

1. Set all switches and controls to OFF or 0.
2. Connect PROGRAM OUTPUT (LINE or MIC LEVEL) to power amplifier, broadcast line feed, etc. Connect speakers to power amplifier. Connect headphones to PHONES or MONITOR/LINE LEVEL jack.
3. Connect sources (microphones, tape recorders, etc.) to INPUT Connectors. Set Channel 7 or 8 MIC/AUX Switches as necessary.
4. Connect external signal-processing equipment (compressor, equalizer, etc.) to LINK Jacks. (To connect two Consoles, connect LINK OUT Jacks together.)
5. Connect ac line cord to ac source.
6. Turn on POWER ON-OFF Switch and allow one to two minutes warmup time.
7. Depress PROGRAM Switches for input channels to be used.
8. Set INPUT ATTEN Switches to preliminary position for type of material to be used (0 for speech, —10 for instrumental music, —20 or —30 for "hard" rock music; Channel 7 or 8 AUX INPUT: —20 or —30).
9. Set MASTER Volume Control to 7, and METER SENSITIVITY Control to CAL. With source input, raise Channel Volume Control for desired sound level. Readjust INPUT ATTEN Switch if necessary.
10. Adjust HI and LO FREQuency EQualization Controls as necessary.
11. Depress REVERB Switch. Adjust REVERB INTENSITY, and HI and LO REVERB FREQuency EQualization Controls as necessary.
12. Depress MONITOR Switches to monitor individual input channels. Raise MONITOR Control to comfortable listening level. Depress PROGRAM MONITOR for total program monitoring (overrides MONITOR Switches).

SR101 Series 2 Audio Console

ARCHITECTS' AND ENGINEERS' SPECIFICATIONS*

The Audio Console shall be a self-contained 90- to 132-volt, 50 to 60 Hz, line-operated, all-silicon transistor mixing amplifier with preamplifiers and controls to mix eight independent low-impedance microphone input signals and to provide two independent outputs: program and monitor.

Each input channel in the Audio Console shall have independent HIGH-FREQUENCY and LOW-FREQUENCY EQUALIZATION controls, four-position zero to 30 dB ATTENUATOR Switch, linear-motion LEVEL control, REVERB INTENSITY control and independent output assignment switches for the PROGRAM and MONITOR buses. The 7th and 8th input channels shall each have two additional input connectors (AUX. LEVEL) and an additional switch to select the desired input connector.

The PROGRAM OUTPUT circuit shall have a 600-ohm balanced line level output rated at +12 dBm at less than 1% distortion with a minimum clipping level of +19 dBm and a low-impedance, balanced, microphone-level output at a level 50 dB below the LINE LEVEL output. A PHASE switch shall be provided to reverse the phase of both the LINE and MICROPHONE LEVEL outputs.

The program channel shall have a linear motion MASTER LEVEL control, four switchable notch-type FEEDBACK FILTERS, a built-in reverberation system with high-frequency equalization and a REVERB "IN/OUT" Switch, and a 76.2 mm (3 in.) illuminated VU meter with a zero to 22 dB variable SENSITIVITY control.

A pair of LINK Jacks shall be provided in the program circuit to allow connection to external equipment such as compressor, limiter, equalizer, additional console, etc.

The monitor circuit shall have a MONITOR LEVEL control, a PROGRAM MONITOR "IN/OUT" Switch that electrically overrides the individual channel MONITOR switches, a 600-ohm unbalanced LINE LEVEL output, and a transformer-coupled headphone (PHONES) output.

*All specifications apply to SR101-2E except: operating voltage is 90-132 or 180-250 volts; no switched AC receptacle is provided.

The Audio Console shall have a voltage gain of 73 ±3 dB and a maximum microphone input sensitivity of 0.4 millivolts for a +4 dBm program output.

The input channel input clipping level, with a zero attenuator setting, shall be 17.5 millivolts minimum with the linear-motion LEVEL control at maximum and shall increase to 315 millivolts minimum with the linear-motion LEVEL control near minimum.

The Audio Console shall be enclosed in a metal housing designed for rack-mounting in standard 19-inch (483 mm) Audio Equipment Racks, desk-top mounting, or mounting in an accessory vinyl-covered wood portable case.

The Audio Console dimensions shall be 311 mm (12¼ in.) in height, 483 mm (19 in.) in width, 143 mm (5⅝ in.) in depth below the rack-mounting surface and 22.2 mm (⅞ in.) above the rack-mounting surface. The weight shall be not more than 10 kg (23 lb.).

The Audio Console shall have a built-in tone oscillator with a LEVEL control, and an accessory lamp connector on the front panel. A POWER ON/OFF toggle switch shall also be located on the front panel. A switched AC receptacle rated for 500 watts maximum load shall be provided.

The MICROPHONE INPUT connectors shall be 3-pin female professional audio type. The AUX. INPUT connectors for channels 7 and 8, the LINK Jacks, and the MONITOR LINE LEVEL OUTPUT Jack shall be two-circuit ¼-inch phone jacks. The PROGRAM LINE LEVEL OUTPUT connectors shall be a 3-pin male professional audio-type. The headphone (PHONES) connector shall be a three-circuit ¼-inch phone jack to be used with either mono or stereo phones with an impedance of 4 ohms or higher. An 11-pin ACCESSORY AUX LEVEL output connector shall provide for connection to accessories.

Any Audio Console not meeting all of the above specifications shall be deemed unacceptable under this specification. The Audio Console shall be a Shure Model SR101.